BARCO

COMMUNICATIONS n.v. s.a.

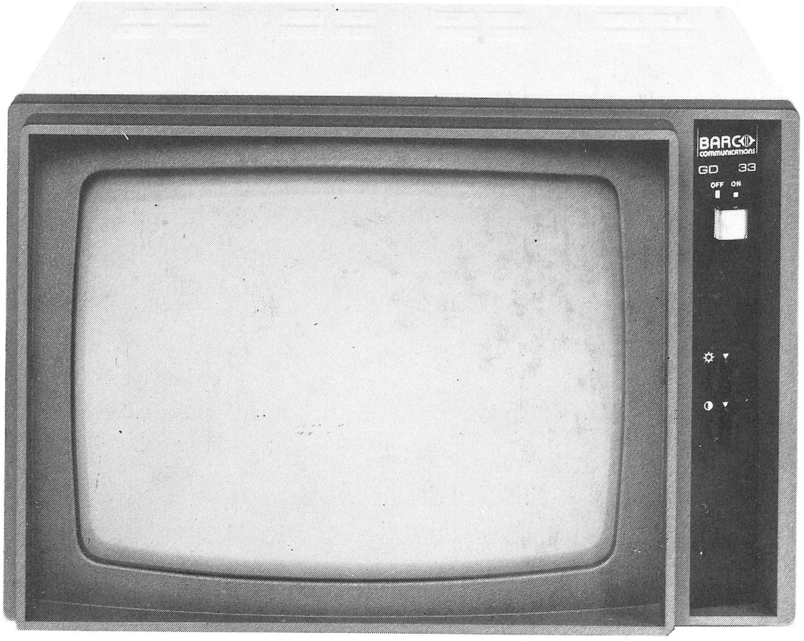
GD 33 120/220 V

MARK I

TECHNICAL MANUAL

C598418

BARCO INDUSTRIES COMMUNICATIONS


BARCO COMMUNICATIONS
GD 33
OFF ON

GD 33 120/220 V

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TECHNICAL MANUAL

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Service Safety Precautions

WARNING : X-RADIATION

X-RADIATION CAN BE CAUSED IF CRITICAL COMPONENTS ARE REPLACED BY NON-CONFORM COMPONENTS. THESE COMPONENTS ARE MARKED IN THIS SERVICE MANUAL BY AN ✳

WARNING : SAFETY

ELECTRIC SHOCK OR FIRE HAZARD CAN BE CAUSED IF CRITICAL COMPONENTS ARE REPLACED BY NON-CONFORM COMPONENTS. THESE COMPONENTS ARE MARKED IN THIS MANUAL BY A ⚠ SIGN.

REPLACE WITH CONFORM TYPES ONLY !

1. Comply with all caution and safety-related notes on or inside the instrument cabinet, on the chassis, or on the picture tube.
2. When service is required, maintain correct lead dress and parts placement. Extra precaution should be taken to assure proper lead dress in the High Voltage circuit area.

   Where a malfunction has occured, those components or circuits that indicate evidence of abnormality should be replaced or corrected. Always use the manufacturer's safety specified replacement components.
3. Do not remove, install or handle the picture tube in any manner unless shatter-proof goggles are worn. People not so equipped should be kept away while picture tubes are handled. Keep picture tube away from the body while handling.
4. Protective shields are provided on this chassis for the protection of both the service technician and the customer.

   Protection shields removed for servicing convenience must be correctly re-installed and ANY MISSING SHIELD MUST BE REPLACED. DO NOT OPERATE THIS INSTRUMENT WITHOUT THE PROTECTIVE SHIELDS IN POSITION AND PROPERLY SECURED.
5. After any service intervention, the service technician must be sure that no protective device built into the instrument by the manufacturer has become defective, or inadvertently defeated during servicing. Therefore, the following checks are recommended for the continued protection of the customer and service technician.

GROUNDING CONTINUITY TEST

— remove mains plug from wall outlet.

— with an ohm-meter in its lowest resistance range, measure resistance between the grounding prong of the mains plug and all accessible conductive parts.
THE METER MUST READ ZERO OHM

— the mains plug still being removed from the wall outlet, switch on the instrument.

— with an ohm-meter in its highest resistance range, measure resistance between the grouding prong of the mains plug and the two other prongs of the mains plug.
BOTH METER READINGS MUST BE MORE THAN 5 MEGOHM.

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE THE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND CORRECTIVE ACTION MUST BE TAKEN BEFORE RETURNING THE INSTRUMENT TO THE CUSTOMER.

X-RADIATION AND HIGH VOLTAGE LIMITS

The primary source of X-radiation in solid state display units is the picture tube. The picture tube is specially constructed to limit X-radiation emissions. The shields and mounting hardware for picture tubes have an X-radiation protection function and must be properly in place.
For continued X-radiation protection, the replacement tube must be the same type as the original, including suffix letter. High voltage is maintained within specified limits by the use of close tolerance safety related components / adjustments in the power supply circuit. Refer to the Technician X-radiation warning note on the Chassis Schematic and Instrument Labels in the Basic Service Data for specific high voltage limits of each chassis and X-radiation Protection Circuits. If high voltage exceeds specified limits, check each component specified on the chassis schematic diagram and take necessary corrective action.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in display units have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by then necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Data and its Supplements and Bulletins. Electrical components having such features are identified by ⚠ or ✳ on the schematics and on the parts list in this Data and its Supplements and Bulletins. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list in this Data and its Supplements and Bulletins, may create shock, fire, or ejessive X-radiation.

NOTE FOR USERS IN THE UNITED KINGDOM :

IMPORTANT :

The wires of the mains lead are coloured in accordance with the following code :

Green and Yellow : EARTH
Blue : NEUTRAL
Brown : LIVE
Plug fusing value : 5 A

As the colours of the wires in the mains lead of this apparatus may not correspond with the colotred markings identifying the terminals in your plug, proceed as follows :

— The wire which is coloured Green and Yellow must be connected to the terminal in the plug which is marked by the letter E or by the safety earth symbol ⏚ or coloured green and yellow.

— The wire which is coloured Blue must be connected to the terminal which is marked with the letter N or coloured black.

— The wire which is coloured Brown must be connected to the terminal which is marked with the letter L or coloured red.

WARNING : This apparatus must be earthed.

FUSE TABLE GD 33

UNIT	DESCRIPTION	POSITION	BC REF. Nº
Mains input	2 A/250 V slow	F1	C3141041
	2 A/250 V slow	F2	C3141041
Switched mode power supply	1,25 A/250 V fast	F1	C314102
	2 A/250 V slow	F2	C314116
	1,6 A/250 V fast	F3	C314106
	1,6 A/250 V fast	F5	C314106
	Fusing resistor 2E2 J 0.25	SR 28	C1011046
	Fusing resistor E1 J 0.40	SR 34	C1011907
	Fusing resistor E22 J 0.40	SR 35	C1011917
	Fusing resistor E1 J 0.40	SR 36	C1011907

CAUTION :

For continued protection against fire hazard.
- Replace with the same type of fuse.
- Refer replacement to qualified service personnel.

Introduction

To help you with the repairing of your colour display GD 33, we made this technical manual.

This manual contains technical information of our colour data display GD 33.

The technical specifications of the GD 33 are given on the pages TM004a, TM004b and TM004c.
How the colour display is compound and the functional description can be found on pages TM005 and TM006.
Dimensions and boardlocations are also taken in this manual.

The circuit of each board is included with a description, diagram, board lay-out, adjustment procedure and spare partslist.

When the display is deranged, the readjustment procedure helps you to adjust the colour display in the good way.

Modifications and upgradings will be announced by means of info T's.

Would you have any additional questions, our Mr. Johan Vanmarcke, service and training manager, will be glad to help you.

Please note in all your correspondence concerning your display the type and partnumber.

Technical manual GD 33

Introduction		TM001
Table of contents		TM002
Technical specification of the GD 33		TM004
Block diagram		TM005
Functional description		TM006
General spare parts		TM007
Dimensions		TM008
Where can we find the different boards		TM009
Switched mode power supply	(C760228U/C660005)	TM010
Sync & vertical deflection	(C760747U)	TM011
Sync & vertical deflection	(C660019)	TM012
Pulse unit	(C760999U)	TM013
Horizontal deflection & EHT Generator	(C761000U)	TM014
RGB out unit	(C761001U)	TM017
RGB in unit	(C761002U)	TM018
CRT Socket unit	(C761041)	TM021
Mains input unit (220 V)	(C761102)	TM023
Mains input unit (120 V)	(C761103)	TM024
Degaussing 12 V unit	(C760797U)	TM026
Recommended spare parts GD 33		TM030
Readjustments procedure GD 33		TM031
Codes to parts lists		TM032

Technical Specifications of the GD 33

CONTROLS ON FRONT PANEL:

- ON/OFF pushbutton switch
- Brightness adjustment
- Contrast adjustment

SYSTEMS:

- 525 lines 60 Hz interlaced or non interlaced
- 625 lines 50 Hz interlaced or non interlaced

POWER:

- mains voltage:
  120 V + 15 % / - 20 %
  220 V + 15 % / - 20 %
- power consumption:
  typical 80 W
  maximum 100 W
- mains frequency:
  48 to 66 Hz
- power connection:
  2.5 detachable three-wire grounding type power cable
- mains isolated switched mode power supply

INPUTS:

Analog RGBS input
(External or internal sync mode selectable by means of a switch).

- red:
  non composite 0.7 Vpp ± 6 dB positive
- green:
  non composite (EXT.sync) 0.7 Vpp ± 6 dB positive
  composite (INT sync) 1.0 Vpp ± 6 dB positive (0.7 V video + 0.3 V sync)
- blue:
  non composite 0.7 Vpp ± 6 dB positive
- sync:
  (external sync) negative 4 Vpp ± 6 dB
- connectors: BNC
- All inputs are looped through output with high impedance or terminated with 75 Ohms internally by means of a switch.
- EXTERNAL of INTERNAL sync mode selectable (switch).

RGB PERFORMANCE:

- frequency response:
  15 kHz to 7 Mhz + 1 dB / - 3dB gradual roll of.

SYNCHRONISATION:

- line scanning: Horizontal retrace time < 10 µs
- vertical scanning: Vertical retrace time < 900 µs
- RS 170 compatible

DISPLAY PERFORMANCE:

- Picture tube: 20" (51 cm) - in line gun - 90°
  W x H: 15.4" x 11.5" (39 cm x 29 cm).
- Overscan possible by adjusting vertical and horizontal amplitude controls.
- Deflection linearity: deviation less than 2 % of picture height.
- High resolution, dotted screen, in line gun, shadow mask, auto convergent black matrix CRT.

  Pitch = 0.31 mm
  Phosphor: P22 (LP on request)
  Resolution: 900 dots, 630 lines
  Character display capacity: 80 char x 25 rows (>2000 characters).
  Max. misconvergence: Zone A: <0.4 mm (in center)
  Zone B: <0.8 mm (on axes)
  Zone C: <1.0 mm (over the whole screen)
- Aspect ratio: adjusted for 4/3 aspect ratio.
- Underscan: standard 4 corners in display.

GENERAL

WARM UP PERIOD:

30 minutes to meet specs.

DEGAUSSING:

Automatic degaussing on switch-on.

X-RAY RADIATION:

$\leqslant$ 0.1 mR/hour at 2" (5 cm) from any external surface of the display. Complies with the DHHS rules and regulations as on the date of manufacturing.

UL APPROVAL:

UL 1410 approval applied for.

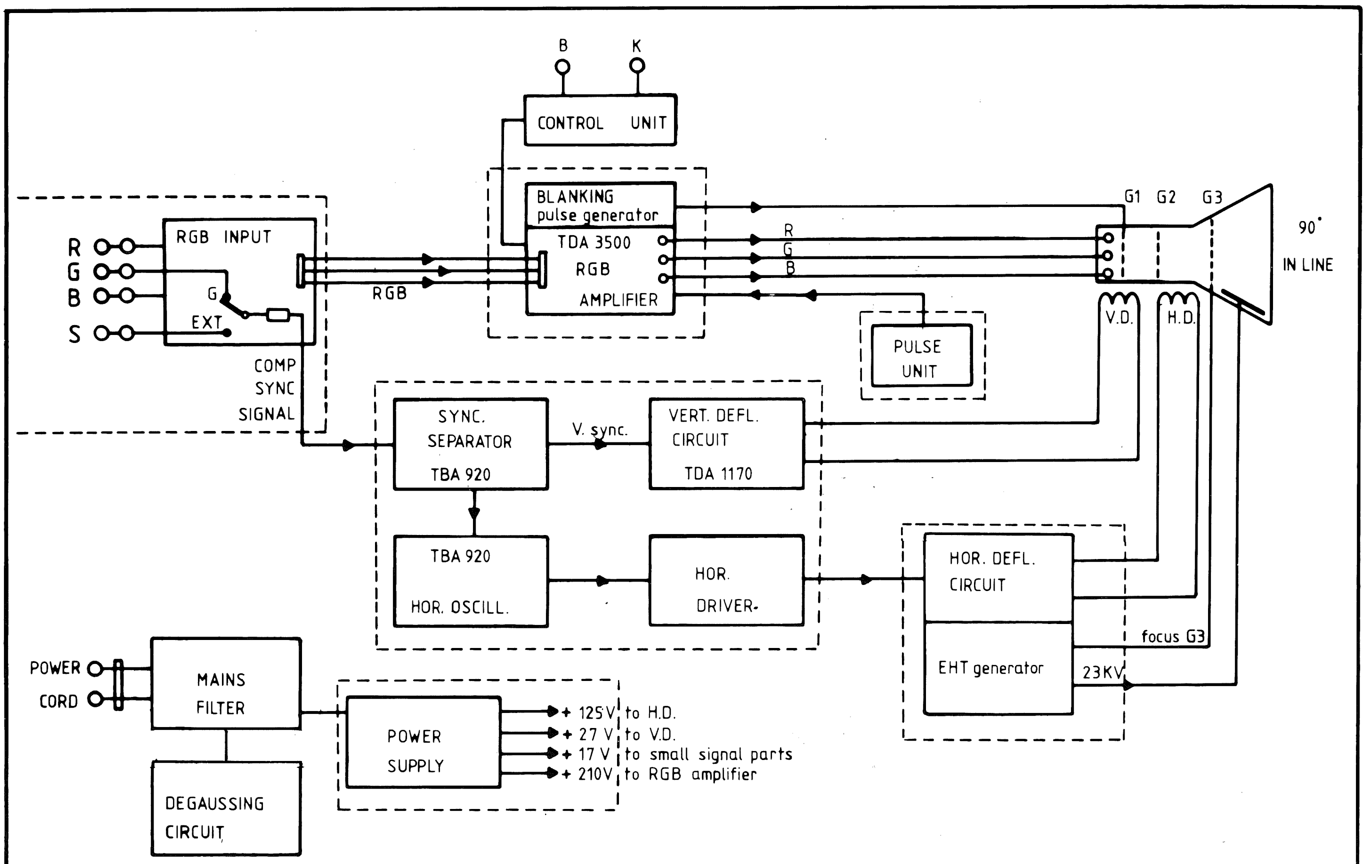
WEIGHT:

netto: 17 kg, 37 Lb
gross (export packing): 21.5 kg, 47 lb

DIMENSIONS: (H x W x D).

266 x 405 x 396 mm
10.47 x 15.94 x 15.59 inch

Block Diagram


B
K
CONTROL UNIT
BLANKING pulse generator
TDA 3500 RGB AMPLIFIER
R
G
B
S
RGB INPUT
G
EXT
RGB
COMP SYNC SIGNAL
G1 G2 G3
90° IN LINE
V.D.
H.D.
PULSE UNIT
SYNC. SEPARATOR TBA 920
V. sync.
VERT. DEFL. CIRCUIT TDA 1170
TBA 920 HOR. OSCILL.
HOR. DRIVER
HOR. DEFL. CIRCUIT
EHT generator
focus G3
23KV
POWER CORD
MAINS FILTER
DEGAUSSING CIRCUIT
POWER SUPPLY
+ 125V to H.D.
+ 27 V to V.D.
+ 17 V to small signal parts
+ 210V to RGB amplifier

BLOCK DIAGRAM | GD 33

MODIFICATIONS RESERVED

5-11-81

These pages describe the flow of the most important signals in the GD 33. You can find a description of the units in their section.

- The Red, Green and Blue analog signals enter the GD 33 via RGB input module and can be terminated (75 Ω), depending on the position of the termination switches in the input module. The signals are amplified by means of differential amplifiers and connected via coaxial cables to the RGB out amplifier. Either the (composite) green signal or the sync input signal, depending on the position of the green/ext switch, is connected to the vertical deflection module as sync signal.
- On the vertical deflection board, the sync pulses become separate from the composite signal by IC TBA 920. From pin 7 of the IC, the composite sync is fed to the integration circuit around Q2, where the vertical sync pulses are separated.
  In latest types the new vertical deflection board has been used (See pages TM012). They synchronize the vertical oscillator on pin 8 of IC TDA 1170.
- The IC TBA 920 further contains the horizontal oscillator and a PLL who compares the position of the horizontal sync pulses with the horizontal flyback pulses on pin 5. This IC also contains a horizontal drive circuit (output on pin 2), which drives the line output transistor on the horizontal deflection board.
- The integrated circuit TDA 1170 contains the complete vertical deflection circuit: oscillator, ramp generator and output amplifier.
- On the horizontal deflection board, the line output transistor switches the deflection voltage across the deflection coil and the line output transformer. 8 kV pulses from the transformer are tripled by the voltage tripler to form the anode voltage for the picture tube (23 kV).
- The pulse unit makes a 3 μS clamping pulse derived from the 350 V horizontal flyback pulses. This clamping pulse is used on the RGB out board to restore the black level during the horizontal blanking time (backporch).
- The RGB out module is built around the video processor IC, TDA 3500, which contains the brightness and contrast control functions. It also provides clamped driver stages, to drive the red, green and blue output amplifiers.
- The line voltage is connected via a RFI filter with the switch mode power supply. This unit provides all necessary voltages to the other circuits of the monitor.

PICTURE TUBE HIGH RESOLUTION (HITACHI)	C1310901

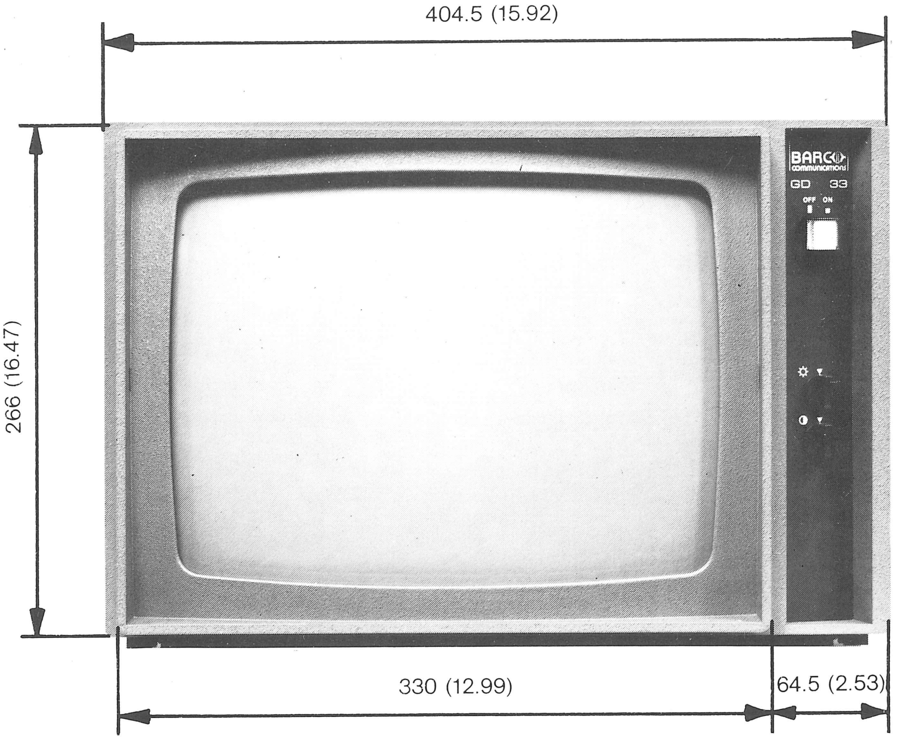
WARNING: X-RADIATION

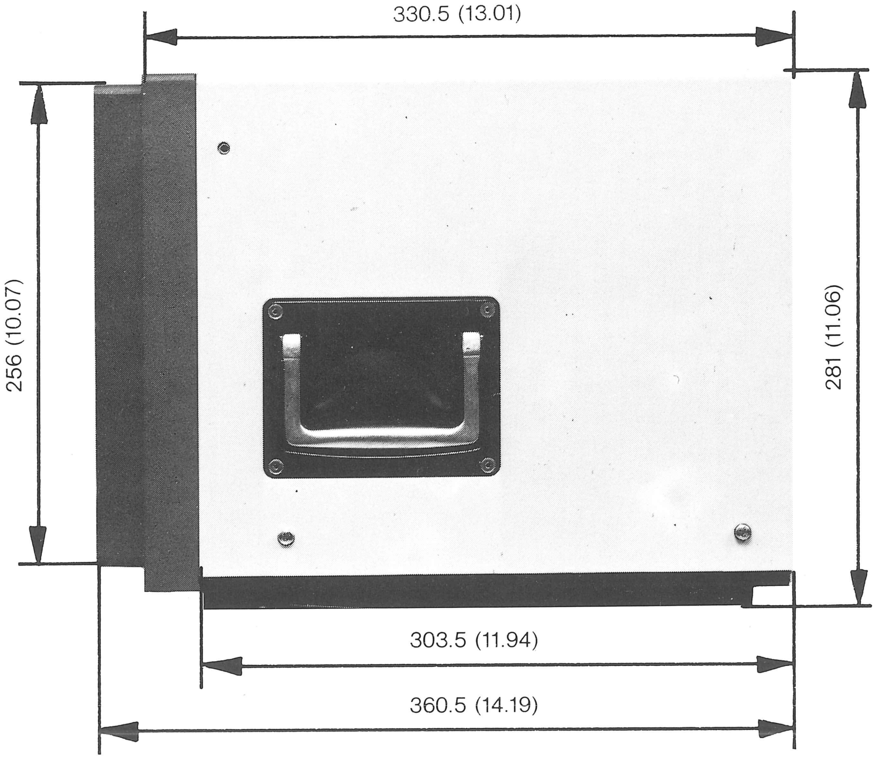
Replacement of picture tube by a non complying type may cause X-Radiation.

MAINS LEAD 3 X 0.75	C326103
CARRYING HANDLE	C356107
VERTICAL DEFLECTION UNIT	C760747U/C660019
DECORATIVE PLATE CONTROL	C600095
BACK COVER	C714646
SWITCHED MODE POWER SUPPLY	C760228U C660005
DEGAUSSING UNIT 12 V	C760797U
PULSE UNIT	C760999U
HORIZONTAL DEFLECTION & EHT GENERATOR UNIT FOR HIGH RESOLUTION	C761000U
HORIZONTAL DEFLECTION & EHT GENERATOR UNIT FOR STANDARD RESOLUTION	C7610002
HORIZONTAL DEFLECTION & EHT GENERATOR UNIT FOR MEDIUM RESOLUTION	C7610005
RGB AMPLIFIER UNIT	C761001U
RGB ANALOG INPUT UNIT	C761002U
CRT SOCKET UNIT FOR HIGH RESOLUTION	C761041
MAINS INPUT UNIT 220 V	C761102
MAINS INPUT UNIT 120 V	C761103
CORD BETWEEN INPUT UNIT AND RGB OUT UNIT	C3493895
CONTROL UNIT	C660075
POTENTIOMETER BRIGHTNESS AND CONTROL	C107130
SCREENING BETWEEN SMPS AND TUBE	C714731
BACK COVER	C714859
TOP COVER	C714590
DECORATIVE PANEL CONTROL UNIT	C714609

CORD TO DEFLECTION COILS	C720604U
CONNECTOR ON CORD C720604U (12P1ZEPCDEF)	C721224U
GROUND CHASSIS	C721587
FRONT BEZZEL	C721588
MAINS SWITCH	C324765
FRAME UNIT	C760741

Dimensions


404.5 (15.92)
266 (16.47)
BARCO COMMUNICATIONS
GD 33
OFF ON
330 (12.99)
64.5 (2.53)

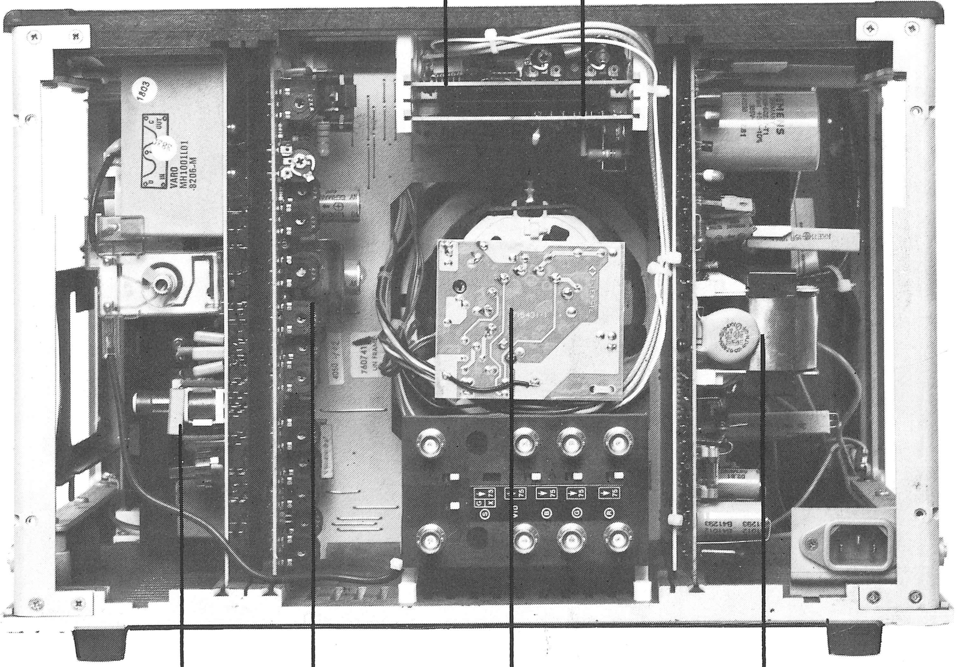

330.5 (13.01)
256 (10.07)
281 (11.06)
303.5 (11.94)
360.5 (14.19)

The sizes are given in mm (inch).

Where can we find the different Boards

RGB AMPLIFIER
C761001U

PULSE UNIT
C760999U



HOR. DEFL. & EHT GEN.

HR: C761000U

VERT. DEFL. & SYNC

C760747U
or
C660019

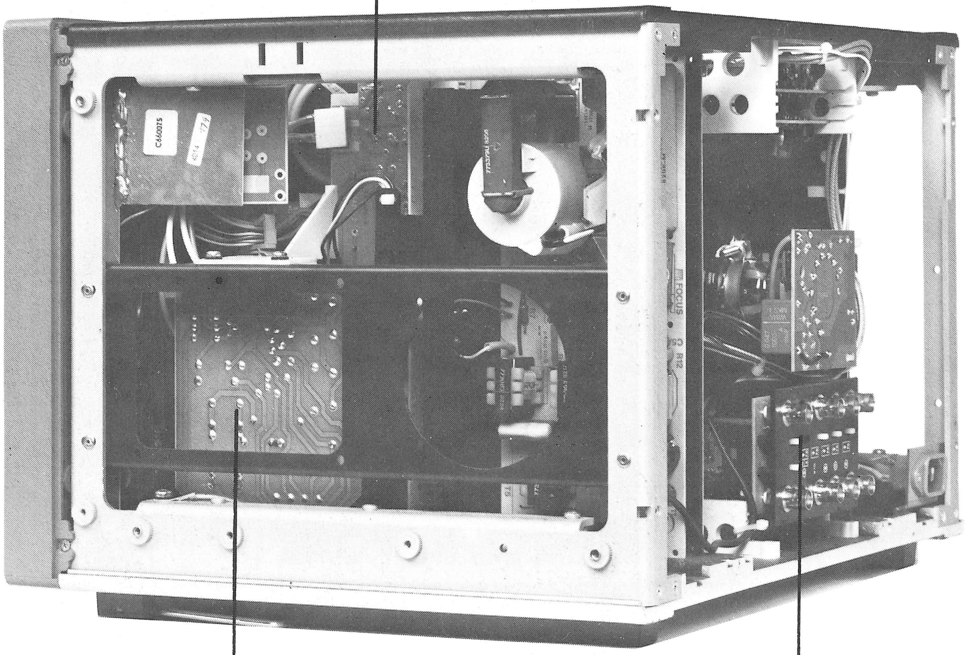
S.M. POWER SUPPLY

C760228U
or
C660005

CRT SOCKET UNIT

C761041

SR: standard resolution
MR: medium resolution
HR: high resolution
LP: long persistance



DEGAUSSING UNIT

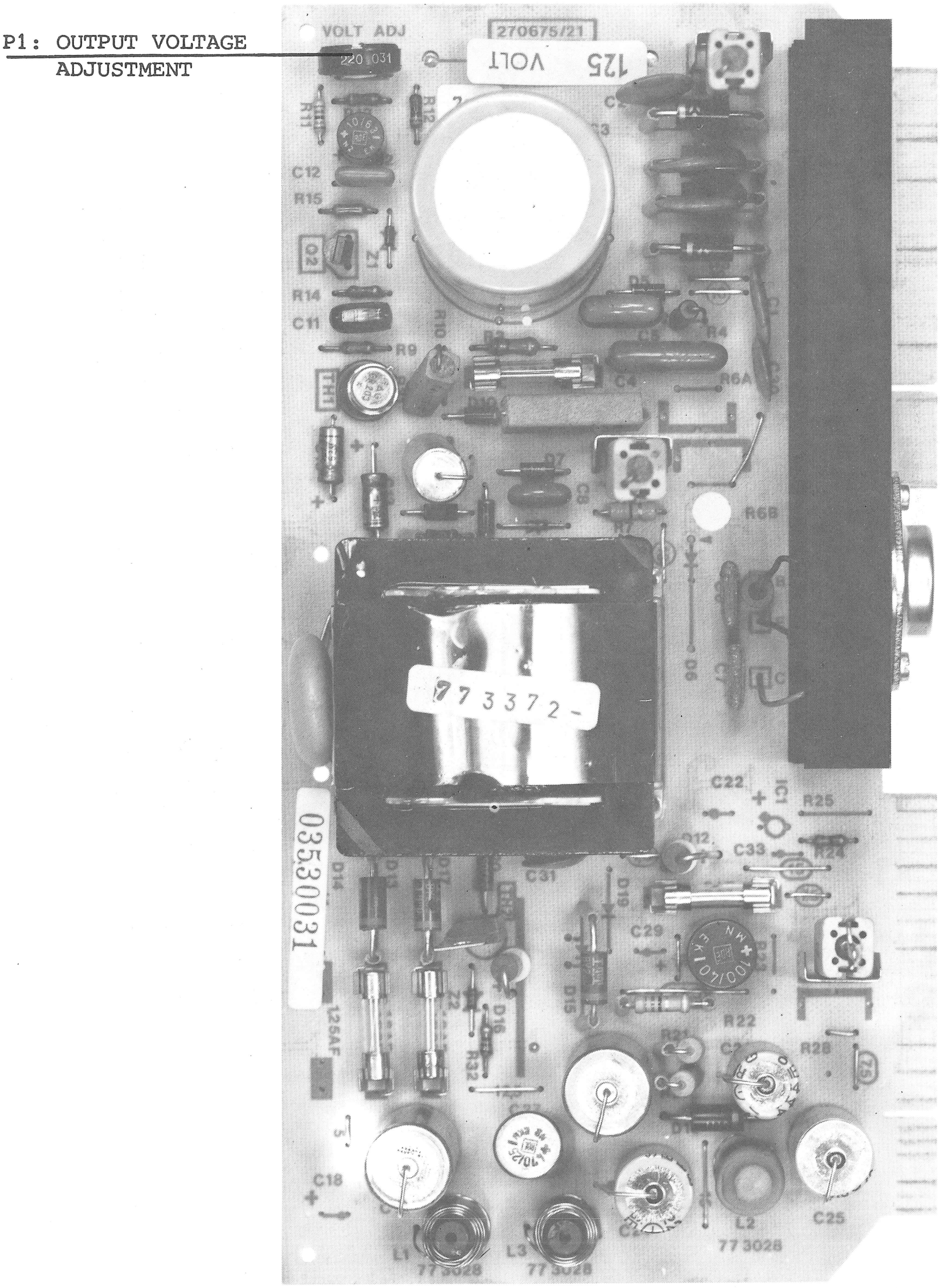
C760797U

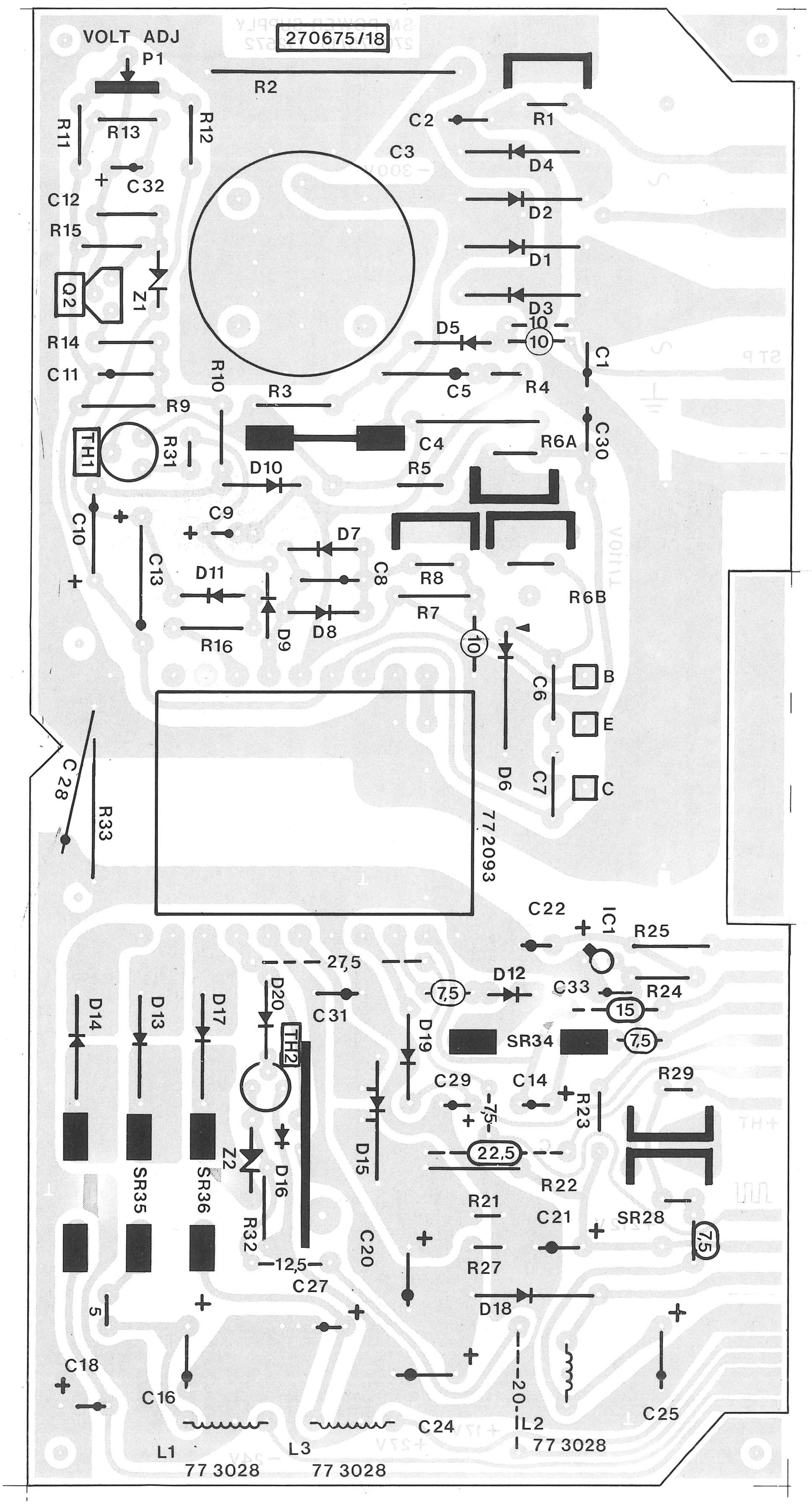
MAINS INPUT UNIT

220 V: C761102
120 V: C761103

INPUT UNIT

C761002U


P1: OUTPUT VOLTAGE ADJUSTMENT
VOLT ADJ
270675/21
125 VOLT
773372-
03530031
125AF
C22
IC1
R25
C33
C31
C29
R22
R28
C18
C25
L1
L2
L3
77 3028


VOLT ADJ
P1
270675/18
R2
R1
C2
C3
D4
D2
D1
D3
R11
R13
R12
C32
C12
R15
Q2
Z1
R14
C11
R10
D5
10
10
C1
C5
R4
R3
R9
TH1
R31
C4
R6A
C30
D10
R5
C10
C9
C13
D7
C8
R8
D11
D9
D8
R7
R6B
R16
10
C6
B
E
C
C7
D6
C28
R33
77 2093
C22
IC1
R25
27,5
D12
C33
R24
D14
D13
D17
D20
C31
7,5
15
TH2
D19
SR34
7,5
C29
C14
R29
R23
-7,5-
D15
Z2
D16
22,5
SR35
SR36
R22
R21
C21
SR28
7,5
R32
C20
R27
-12,5-
C27
D18
5
C18
C16
-20-
C24
L2
C25
L1
L3
77 3028
77 3028
77 3028

CAUTION: X-RAY RADIATION

1. Correct adjustment of P1 is utmost important to obtain correct E.H.T. voltage and safe X-ray radiation limits.

2. P1 is factory sealed with NO.: 395140. Do not attempt to defeat the sealing or to reset P1 unless according to the following instructions:

   a) Replacement of any component of the SM power supply must be followed by measurement of 125 V output voltage at edge contact 9 of the SM Power supply board.

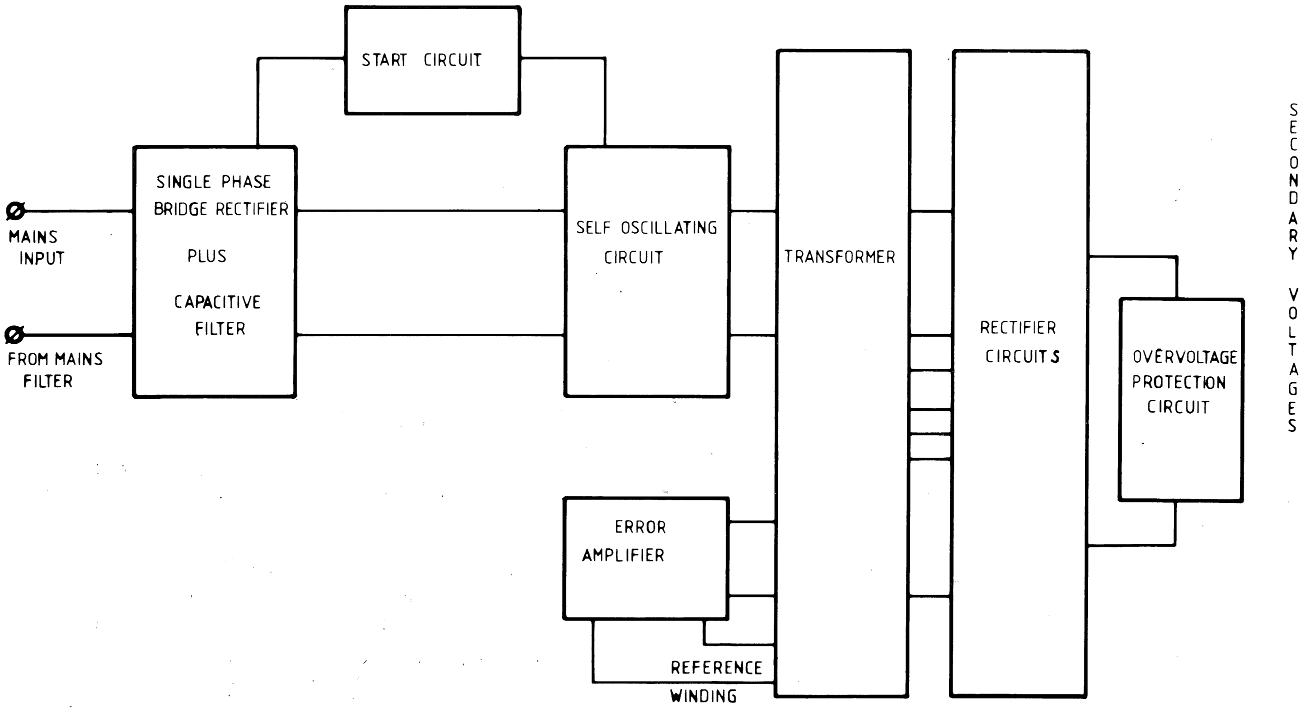
   b) If voltage measured under (a) is not between 122.5 and 127.5 Volt; replacement, readjustment and resealing of P1 becomes mandatory, and testing of the B+ Hold down circuit is strongly advised (d).

ADJUSTMENT PROCEDURE

- Replace P1 by an unsealed device of exactly the same type.
- Connect a D.V.M. (precision 1 %) to contact 9 of SM Power supply.
- Adjust P1 to obtain 125 V reading (Brightness and contrast adjusted to obtain a normal picture).
- Seal P1 with NO. 395140.

TEST OF B+ HOLD DOWN CIRCUIT

Inject + 19 Volt DC at the junction point of D17 and Z2, the set must fail safe (0 Volt at point 9).


START CIRCUIT
MAINS INPUT
FROM MAINS FILTER
SINGLE PHASE BRIDGE RECTIFIER PLUS CAPACITIVE FILTER
SELF OSCILLATING CIRCUIT
TRANSFORMER
RECTIFIER CIRCUITS
OVERVOLTAGE PROTECTION CIRCUIT
SECONDARY VOLTAGES
ERROR AMPLIFIER
REFERENCE WINDING

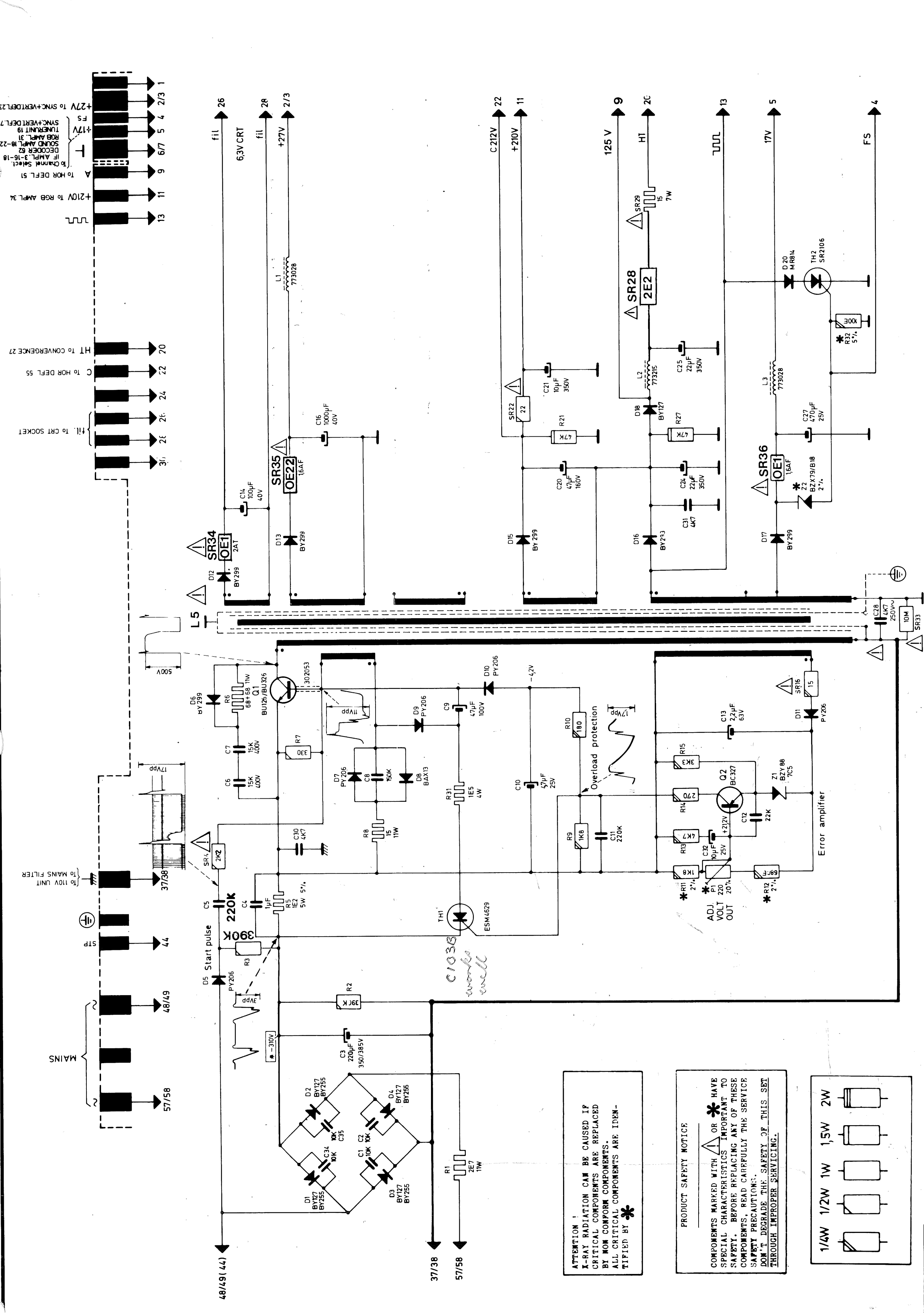
C760228U

BLOCKDIAGRAM POWER SUPPY UNIT

MODIFICATIONS RESERVED

18-11-81

The blockdiagram can be found on this page and the electrial diagram on page TM010e.
The operation of this unit depends on a self oscillating circuit. The frequency of the oscillation depends on the input voltage and the load.
The mains input is fed to a fullwave rectifier and smoothing capacitor. Note that for 120 V version, a voltage doubler circuit is used instead of the fullwave rectifier.
The transistor Q1 is placed in series with the primary of transformer T1.
When the transistor conducts, the primary winding will store energy. When the transistor blocks, the energy in the transformer is delivered via the secondary windings to the load.
The blocking of the transistor Q1 is achieved by the firing of the thyristor TH1.
A base winding ensures a fast switching of the transistor.
The voltage across R5 together with a voltage supplied by an output voltage control circuit determines the firing of thyristor. Capacitor C9 causes that the current level of the thyristor decreases below its holding level, so it switches off.
The real starting pulse for the self oscillating circuit is achieved by the mains supply when switching the set on.
The output voltage control circuit is supplied from a secondary winding which stores a voltage on capacitor C13 proportional to the energy stored during conduction. Transistor Q2 compares this voltage, adjusted with P1 with a reference voltage. The current delivered by this circuit controls the thyristor.
The various output voltages are rectified and smoothed.
The thyristor TH2 is an overvoltage protection circuit. When the voltage on the 17 V winding increases to 18,6 V, TH2 conducts and short circuits the secundary winding of the transformer. This causes an interrupted operation of the switch mode power supply.


+27V To SYNC+VERT.DEFL.23
FS
+17V TUNERUNIT 19 SYNC+VERT.DEFL.7
SOUND AMPL.18-22 DECODER 62 RGB AMPL.31
IF AMPL.3-16-18 To Channel Select.
A To HOR DEFL 51
+210V To RGB AMPL 34
HT To CONVERGENCE 27
C To HOR DEFL 55
fil. To CRT SOCKET
To 110V UNIT
To MAINS FILTER
STP
MAINS
1
2/3
4
5
6/7
9
11
13
20
22
24
26
28
30
37/38
44
48/49
57/58
fil
6,3V CRT
+27V
C 212V
+210V
125 V
HT
17V
FS
L1 773028
L2 773215
L3 773028
SR34 OE1 2AT
SR35 OE22 1,6AF
SR36 OE1 1,6AF
SR28 2E2
SR29 15 7W
SR22 22
SR16 15
SR33 10M MGHV-1W
SR4 2K2
D12 BY299
D13 BY299
D15 BY299
D16 BY299
D17 BY299
D18 BY127
D20 MR814
TH2 SR2106
R32 100E 5%
Z2 BZX79/B18 2%
C14 100µF 40V
C16 1000µF 40V
C21 10µF 350V
C20 47µF 160V
C25 22µF 350V
C24 22µF 350V
C31 4K7
C27 470µF 25V
C28 4K7 250V~
R21 47K
R27 47K
L5
500V
17Vpp
11Vpp
12Vpp
1Vpp
D6 BY299
R6 68 68 11W
Q1 BU126/BU326
302053
C7 15K 400V
C6 15K 400V
R7 330
D7 PY206
C8 150K
D8 BAX13
D9 PY206
D10 PY206
C9 47µF 100V
-42V
R10 180
Overload protection
C10 47µF 25V
R9 1K8
C11 220K
C13 2,2µF 63V
D11 PY206
R15 3K3
R14 270
Q2 BC327
Z1 BZY88 C5
C12 22K
R13 4K7
+212V
C32 10µF 25V
R11 1K8 2%
P1 220 20%
ADJ VOLT OUT
R12 68E 2%
Error amplifier
R8 15 11W
C30 4K7
R31 1E5 4W
C5 220K
C4 1µF
R5 1E2 5W 5%
TH1 ESM4629
R3 390K
D5 PY206
Start pulse
R2 39K
C3 220µF 350/385V
-310V
D2 BY127 BY255
C35 10K
D4 BY127 BY255
C2 10K
C34 10K
C1 10K
D1 BY127 BY255
D3 BY127 BY255
R1 2E7 11W
48/49(44)
37/38
57/58
1/4W
1/2W
1W
1,5W
2W

C1038 works well

ATTENTION !
X-RAY RADIATION CAN BE CAUSED IF CRITICAL COMPONENTS ARE REPLACED BY NON CONFORM COMPONENTS.
ALL CRITICAL COMPONENTS ARE IDENTIFIED BY ✱

PRODUCT SAFETY NOTICE

COMPONENTS MARKED WITH △ OR ✱ HAVE SPECIAL CHARACTERISTICS IMPORTANT TO SAFETY. BEFORE REPLACING ANY OF THESE COMPONENTS, READ CAREFULLY THE SERVICE SAFETY PRECAUTIONS.
DON'T DEGRADE THE SAFETY OF THIS SET THROUGH IMPROPER SERVICING.

MODIFICATIONS RESERVED

17-11-81

760228U UN.SUPH125

GR Gr

SWITCHED MODE POWER SUPPLY | C7602286 | Page nr.: TM010e

PARTS LIST

HOR. DEFL. & EHT GEN.

Part nr.: C761000U

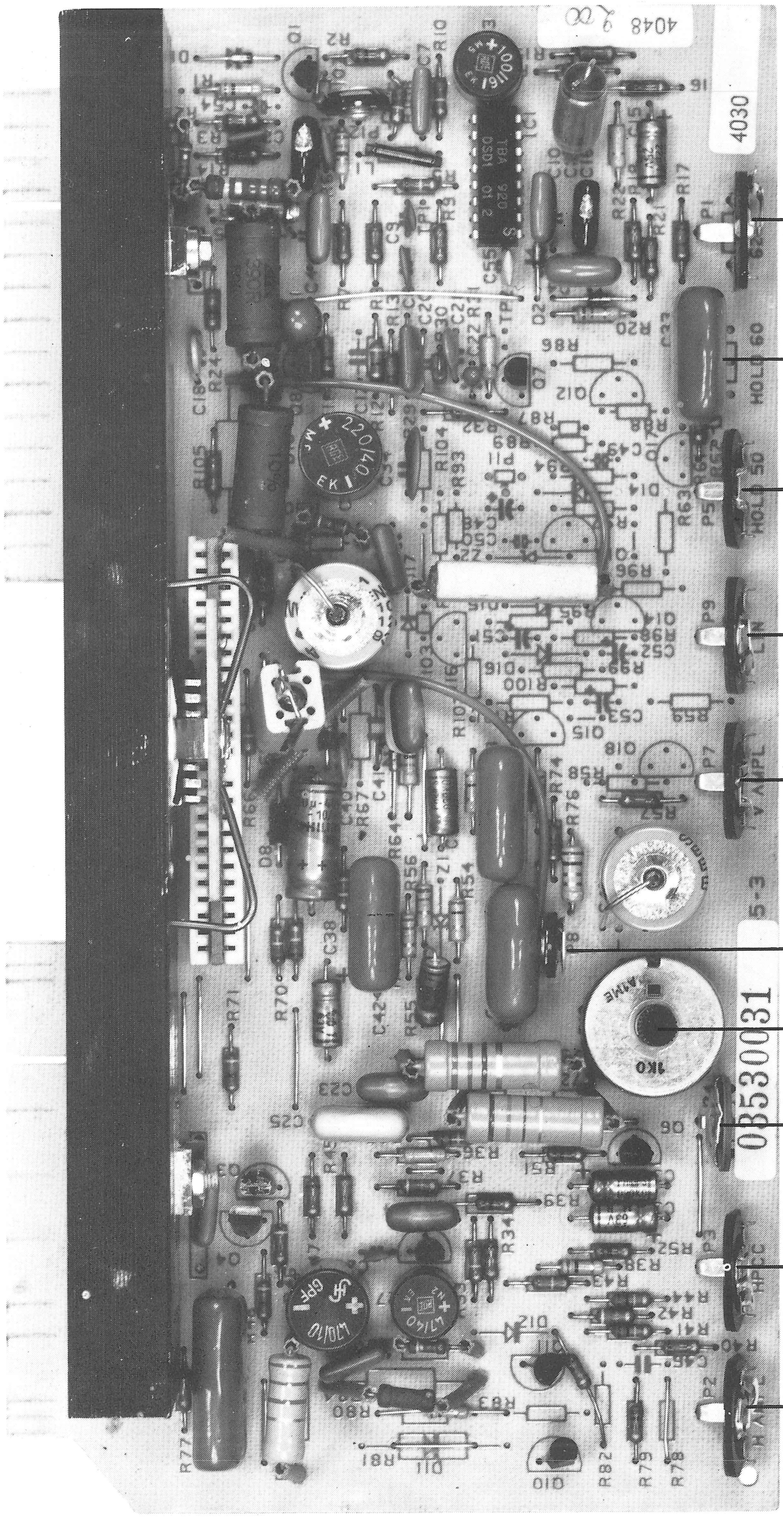
REF. NR.	POSITION	DESCRIPTION
C112837	C1	CCE DI 10K S 400
C112837	C2	CCE DI 10K S 400
C111654	C3	CELRA 220M T 385
C114106	C4	CPOMEFF 1M K 100
C114166	C5	CPOMEFF 220K K 400
C114451	C6	CPO FF 15K K 400
C114451	C7	CPO FF 15K K 400
C114101	C8	CPOMEFF 150K K 100
C111388	C9	CELSN 47M T 100
C111184	C10	CELAX 4M7 Z 40
C114102	C11	CPOMEFF 220K K 100
C114124	C12	CPOMEFF 22K K 250
C111196	C13	CELAX 2M2 Z 63
C111487	C14	CELPR 100M T 40
C1113711	C16	CELSN 1000M T 40
C111399	C20	CELSN 47M T 160
C111416	C21	CELSN 10M T 350
C111418	C24	CELSN 22M T 350
C111418	C25	CELSN 22M T 350
C111479	C27	CELPR 470M Z 35
C1128338	⚠ C28	CCEULDI 4K7 S 125
C112833	C30	CCE DI 4K7 S 400
C112833	C31	CCE DI 4K7 S 400
C111494	C32	CELPR 10M Z 63
C112837	C34	CCE DI 10K S 400
C112837	C35	CCE DI 10K S 400
C131902	D1	SMCDIOREC BY 127
C131902	D2	SMCDIOREC BY 127
C131902	D3	SMCDIOREC BY 127
C131902	D4	SMCDIOREC BY 127
C131911	D5	SMCDIOREC PY 206
C131911	D7	SMCDIOREC PY 206
C131621	D8	SMCDIO BAX 13
C131911	D9	SMCDIOREC PY 206
C131911	D10	SMCDIOREC PY 206
C131911	D11	SMCDIOREC PY 206
C131921	D12	SMCDIOREC BY 299
C131921	D13	SMCDIOREC BY 299
C131921	D15	SMCDIOREC BY 299
C131921	D16	SMCDIOREC BY 299
C131921	D17	SMCDIOREC BY 299
C131902	D18	SMCDIOREC BY 127
C131925	D20	SMCDIOREC MR 814

REF. NR.	POSITION	DESCRIPTION
C773028	L1	SPOCHOKE SMPOWER31
C773215	L2	SPOCHOKE SM POWER
C773028	L3	SPOCHOKE SMPOWER31
C773372U	⚠ * L5	TRF SM POWER
C1062022	* P1	RTCASCV 220E M 0,15
C132509	Q1	SMCTRA BU 208A
C132501	Q2	SMCTRA BC 327-2
C104406	R1	RRWW V 2E7 K11
C101267	R2	RRCF 390K J 0,50
C101267	R3	RRCF 390K J 0,50
C1012409	⚠ SR4	RRCFFUL 2K2 J 0,50
C103725	R5	RRWW H 1E2 J 5
C101230	R7	RRCF 330E J 0,50
C104415	R8	RRWW V 15E K11
C101139	R9	RRCF 1K8 J 0,25
C101127	R10	RRCF 180E J 0,25
C1011392	R11	RRCF 1K8 G 0,20
C1011342	R12	RRCF 680E G 0,20
C101144	R13	RRCF 4K7 J 0,25
C101129	R14	RRCF 270E J 0,25
C101142	R15	RRCF 3K3 J 0,25
C1011149	⚠ SR16	RRCFFUL 15E J 0,25
C103256	R21	RRMO 47K J 1,50
C101269	⚠ SR22	RRCFFUL 22E J 0,50
C101118	R24	RRCF 33E J 0,25
C101228	R25	RRCF 220E J 0,50
C103256	R27	RRMO 47K J 1,50
C1011046	SR28	RRCFF 2E2 J.25
C104415	R29	RRWW V 15E K 11
C103614	R31	RRWW H 1E5 K 4
C101124	R32	RRCF 100E J 0,25
C1046781	⚠ SR33	RRHV 10M J 1
C1012907	⚠ SR34	RRCFF E1 J 0,50
C1011917	⚠ SR35	RRCFF E22 J 0,40
C1011907	⚠ SR36	RRCFF E1 J 0,40
C132207	TH1	SMCTHY ESM4629
C132210	TH2	SMCTHY SR 2106
C131756	Z1	SMCDIOZEN 0.56 7V5
C131766	* Z2	SMCDIOZEN 0.5 B18
In C660005 version:		
C1147009	⚠ C28	CCESADI UL 4K7 MAC 400

BARCO INDUSTRIES COMMUNICATIONS

Sync & Vertical Deflection

C760747U



P1: HORIZONTAL FREQUENCY

P6: VERTICAL HOLD 60

P5: VERTICAL HOLD 50

P9: LINEARITY

P7: VERTICAL AMPLITUDE

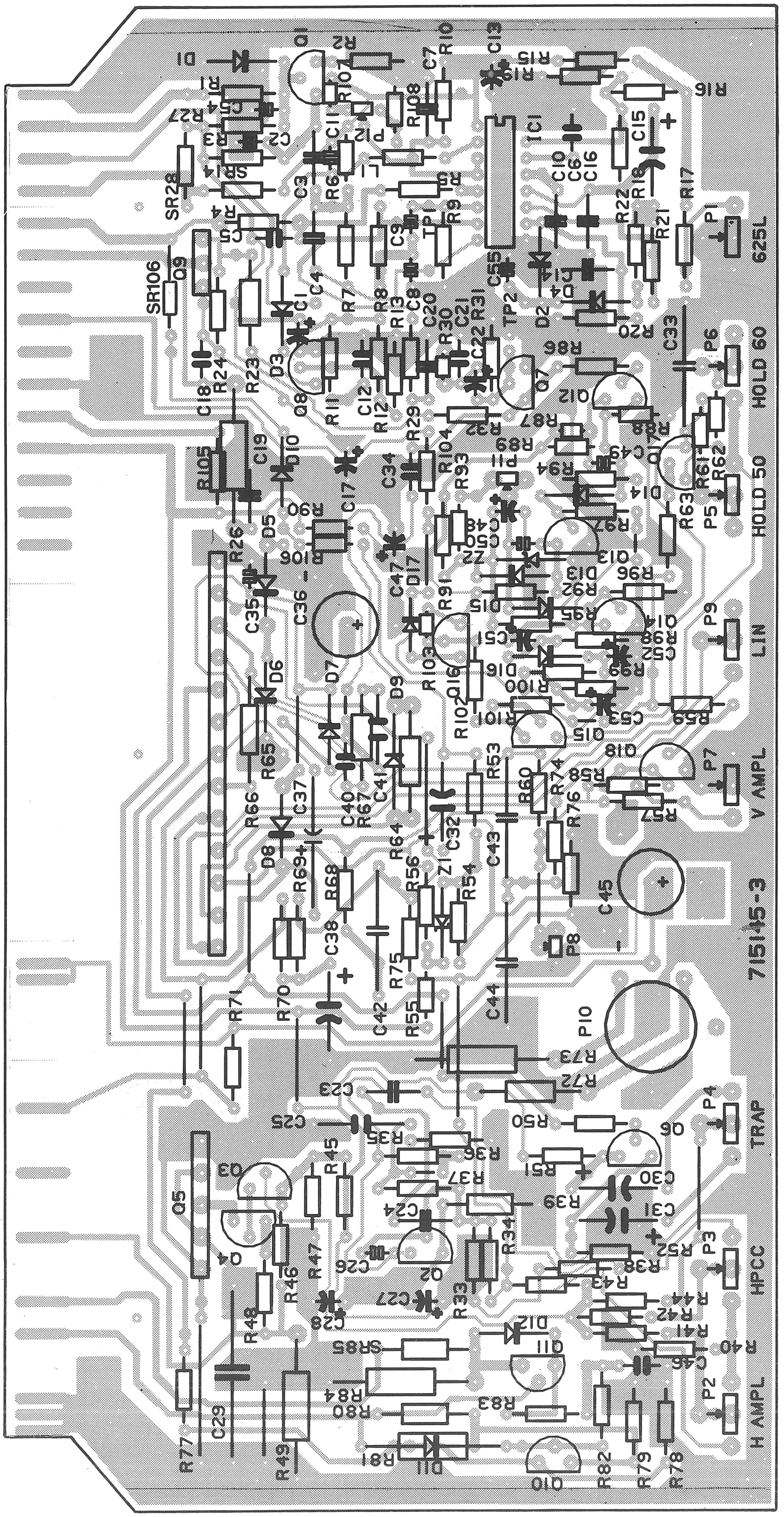
P8: S CORRECTION

P10: VERTICAL SHIFT

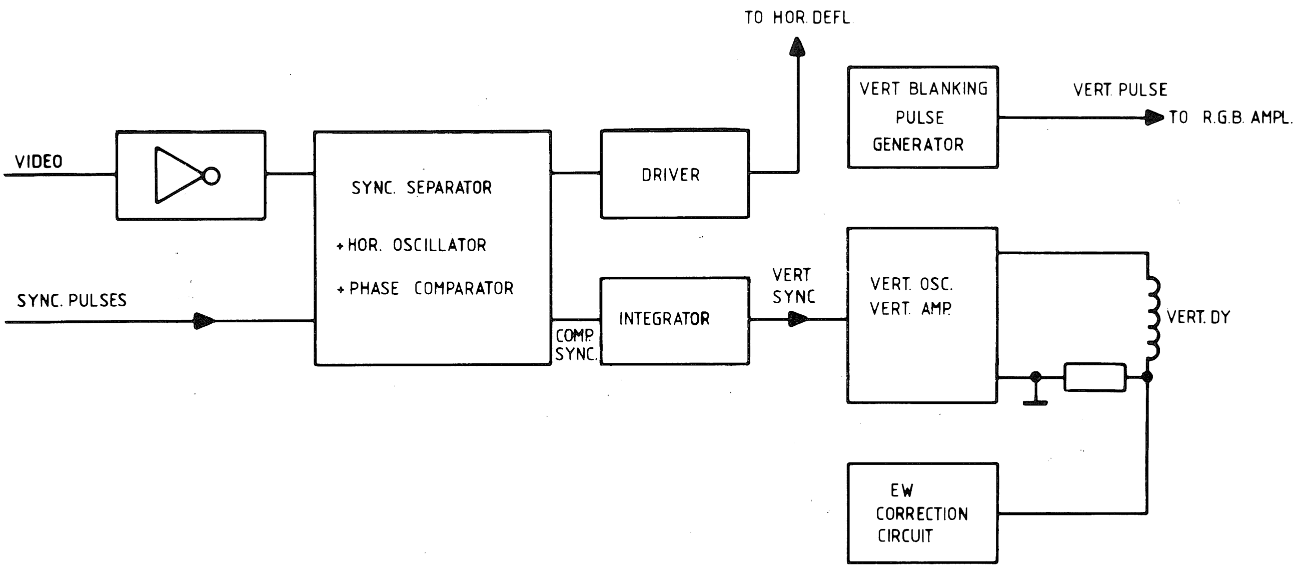
P4: TRAPEZIUM CORRECTION

P3: HORIZONTAL PIN CUSHION CORRECTION

P2: HORIZONTAL AMPLITUDE


625L
HOLD 60
HOLD 50
LIN
V AMPL
715145-3
TRAP
HPCC
H AMPL
IC1
P1
P2
P3
P4
P5
P6
P7
P8
P9
P10
P12
TP1
TP2

SYNC & VERTICAL DEFLECTION | C760747U | Page nr.: TM011b


TO HOR. DEFL.
VERT BLANKING PULSE GENERATOR
VERT. PULSE
TO R.G.B. AMPL.
VIDEO
SYNC. SEPARATOR
+HOR. OSCILLATOR
+PHASE COMPARATOR
DRIVER
SYNC. PULSES
COMP. SYNC.
INTEGRATOR
VERT SYNC
VERT. OSC.
VERT. AMP.
VERT. DY
EW CORRECTION CIRCUIT

760747U

BLOCK DIAGRAM SYNC & VERT DEFL

MODIFICATIONS RESERVED

19-11-81

DESCRIPTION:

The Sync. and vertical deflection unit is built around two I.C.'s: TBA 920 S and TDA 1170. IC1 separates the sync. signal from the incoming composite video signal (pin 8). The I.C. contains an oscillator which is controlled by two phase comparators comparing on the one hand the separated sync. pulse and on the other the line flyback pulse from the horizontal deflection unit.

The line driver output (pin 2) drives 2 transistors (Q8, Q9) on this board which in turn drive the horizontal deflection transistor on the Horizontal deflection board.

The field sync pulses are separated from the composite sync. signal (Q7) and applied to I.C.2.

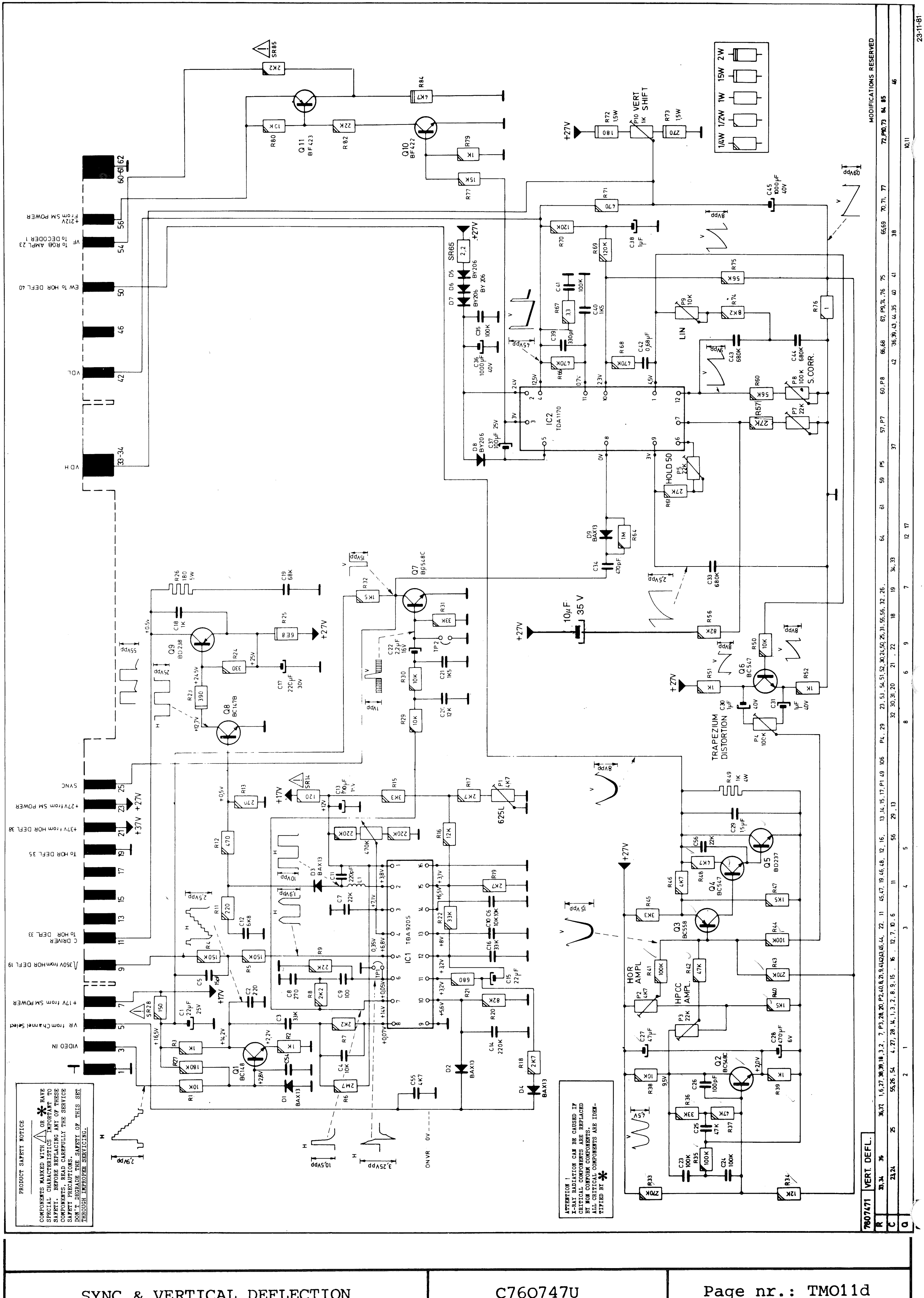
I.C.2. is used to generate the vertical deflection current (output pin 4).

The frequency of the internal oscillator is synchronised with the incoming sync. signal (pin 8) and may be adjusted with P5 (vert. Hold).

Pulses from an internal vertical flyback generator are applied to the yoke via the internal power amplifier. They are also applied to the vertical flyback pulse shaping circuit (Q10, Q11).

A parabolic voltage for east-west correction is formed from the sawtooth waveform found on junction C45-R76 with the circuit containing transistors Q2, Q3, Q4 and Q5.

The trapezium distortion correction is formed with transistor Q6 and is adjusted with P4.


IC1 TBA920S
IC2 TDA1170
Q1 BC148
Q2 BC548C
Q3 BC558
Q4 BC547
Q5 BD237
Q6 BC547
Q7 BC548C
Q8 BC147B
Q9 BD238
Q10 BF422
Q11 BF423
D1 BAX13
D2 BAX13
D3 BAX13
D4 BAX13
D5 BY206
D6 BY206
D7 BY206
D8 BY206
D9 BAX13
P1 4K7 625L
P2 4K7 HOR AMPL
P3 22K HPCC AMPL
P4 100K TRAPEZIUM DISTORTION
P5 22K HOLD 50
P7 22K
P8 100K S.CORR.
P9 10K LIN
P10 1K VERT SHIFT
SR14
SR28
SR65
SR85
VIDEO IN
VR from Channel Select
+17V from SM POWER
350V from HOR DEFL 19
C DRIVER to HOR DEFL 33
To HOR DEFL 35
+37V from HOR DEFL 38
+27V from SM POWER
SYNC
VDH
VDL
EW to HOR DEFL 40
VF To DECODER 1 To RGB AMPL 23
+212V From SM POWER
+27V
+17V
+37V
10µF 35 V
1/4W 1/2W 1W 15W 2W
MODIFICATIONS RESERVED
VERT. DEFL.
7607471
23-11-81

PRODUCT SAFETY NOTICE

COMPONENTS MARKED WITH ⚠ OR ✱ HAVE SPECIAL CHARACTERISTICS IMPORTANT TO SAFETY. BEFORE REPLACING ANY OF THESE COMPONENTS, READ CAREFULLY THE SERVICE SAFETY PRECAUTIONS. DON'T DEGRADE THE SAFETY OF THIS SET THROUGH IMPROPER SERVICING.

ATTENTION !
X-RAY RADIATION CAN BE CAUSED IF CRITICAL COMPONENTS ARE REPLACED BY NON CONFORM COMPONENTS.
ALL CRITICAL COMPONENTS ARE IDENTIFIED BY ✱

SYNC & VERTICAL DEFLECTION	C760747U	Page nr.: TM011d

ADJUSTMENT PROCEDURE

1. THE LINE OSCILLATOR

- short circuit the testpoint TP1 to earth.
- adjust P1 "line freq." in order to get a minimal horizontal beat.
- take away the short circuit.

2. THE VERTICAL OSCILLATOR

- short circuit the testpoint TP2 to earth.
- adjust P5 (vert Hold) to obtain an upwards vertical beat of 3 turns per second approximately.
- take away the short circuit.

3. VERTICAL LINEARITY AND DIMENSIONS

- the vertical linearity is adjusted by means of P9 (vert lin). It is advisable to use a test pattern.
- S correction is adjusted with P8.
- the vertical amplitude is adjusted by means of P7 (vert ampl).
- the vertical picture centering is carried out by means of the potentiometer P10 (vert shift).

4. EAST-WEST PIN CUSHION CORRECTION

The deformation of the vertical lines on the left and right side of the screen can be:

a) Parabolic deformation: this can be corrected by means of P3 (Hor. PCC).
b) Trapezoidal deformation: this can be adjusted by means of P4 (trap dist.).

5. HORIZONTAL AMPLITUDE

The horizontal amplitude can be adjusted by means of P2. This adjustment can influence the east-west pin cushion correction so that we must recheck point 4.

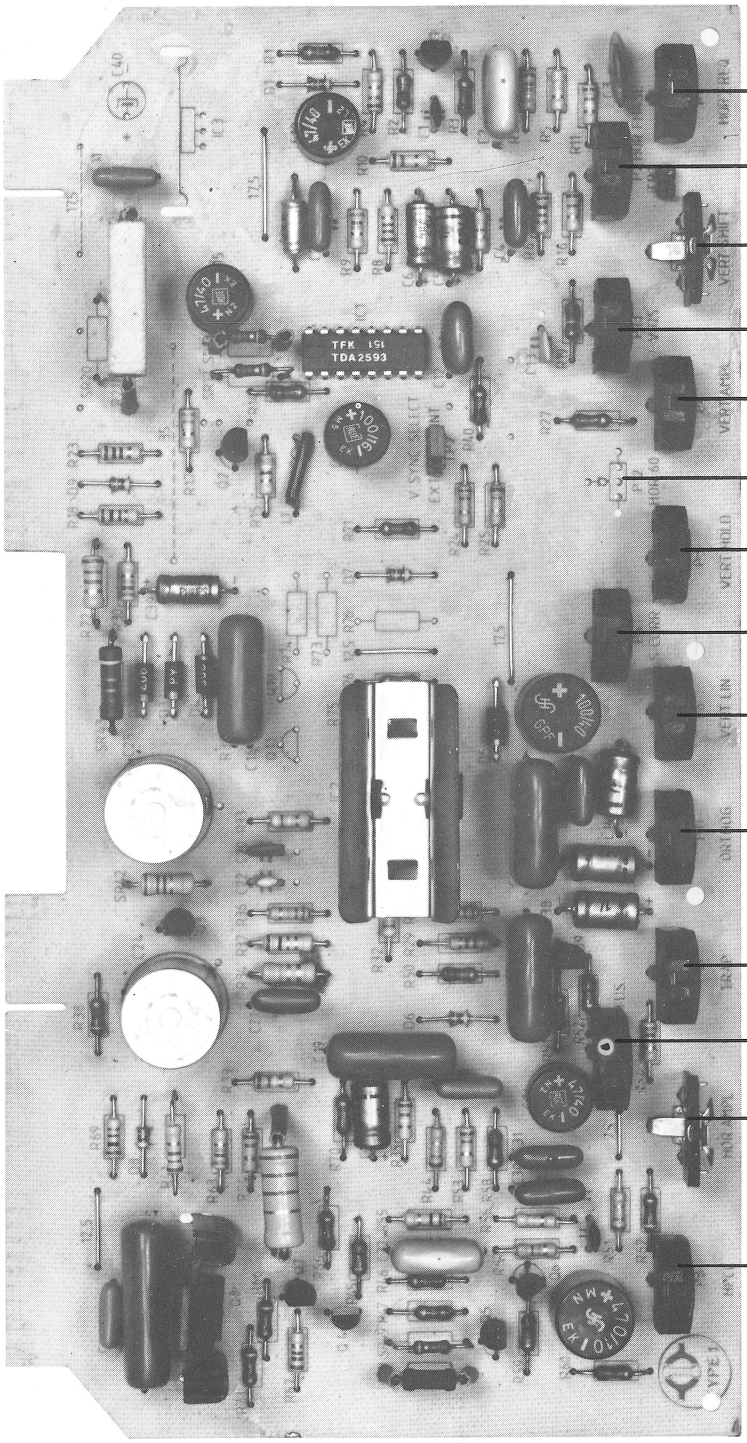
PARTS LIST
SYNC & VERT DEFLECTION UNIT
Part nr.: C760747U

REF. NR.	POSITION	DESCRIPTION
C1115105	C1	CELSNMI 22M M5 25
C112366	C2	CN750MI 220P G5 63
C114126	C3	CPOMEFF 33K K 250
C114120	C4	CPOMEFF 10K K 250
C112112	C5	CNPO TU 15P J 500
C116239	* C6	CSR 10K H 160
C114124	C7	CPOMEFF 22K K 250
C112367	C8	CN750MI 270P G5 63
C112362	C9	CN750MI 100P G5 63
C114120	C10	CPOMEFF 10K K 250
C112366	C11	CN750MI 220P G5 63
C111466	C13	CELPR 100M Z 16
C114102	C14	CPOMEFF 220K K 100
C111157	C15	CELAX 22M Z 25
C114126	C16	CPOMEFF 33K K 250
C111488	C17	CELPR 220M Z 40
C112825	C18	CCE DI 1K S 400
C114130	C19	CPOMEFF 68K K 250
C114121	C20	CPOMEFF 12K K 250
C112827	C21	CCE DI 1K5 S 400
C111878	C22	CELTA 2M2 S 16
C114100	C23	CPOMEFF 100K K 100
C114100	C24	CPOMEFF 100K K 100
C114104	C25	CPOMEFF 470K K 100
C112362	C26	CN750MI 100P G5 63
C111486	C27	CELPR 47M Z 40
C111452	C28	CELPR 470M Z 6
C114146	C29	CPOMEFF 1M5 K 250
C1111961	C30	CELAX 1M Z 63
C1111961	C31	CELAX 1M Z 63
C1111841	C32	CELAX 1M T 40
C114142	C33	CPOMEFF 680K K 250
C810138	C34	112387 470P G5 100
C112774	C35	CCE MI 100K U5 63
C1113711	C36	CELSN 1000M T 40
C111190	C37	CELAX 100M T 40
C1111841	C38	CELAX 1M T 40
C1122395	C39	CNPO MI 56P G5 63
C112827	C40	CCE DI 1K5 S 400
C114100	C41	CPOMEFF 100K K 100
C114142	C42	CPOMEFF 680K K 250
C114142	C43	CPOMEFF 680K K 250
C114142	C44	CPOMEFF 680K K 250
C1113711	C45	CELSN 1000M T 40
C112747	C55	CCE MI 4K7 K5 63
C114124	C56	CPOMEFF 22K K 250
C114121	C57	CPOMEFF 12K K 250
C112367	C39A	CN750MI270P G5 63
C131621	D1	SMCDIO BAX 13
C131621	D2	SMCDIO BAX 13
C131621	D3	SMCDIO BAX 13
C131621	D4	SMCDIO BAX 13
C131911	D5	SMCDIOREC PY 206
C131911	D6	SMCDIOREC PY 206
C131911	D7	SMCDIOREC PY 206
C131911	D8	SMCDIOREC PY 206
C131621	D9	SMCDIO BAX 13
C131910	D10	SMCDIO PY 207
C1321381	IC1	SMCICLOSC TBA 920S
C132164	IC2	SMCICLWBA TDA 1170
C773054	L1	SPON 32,5 RK 1,6 D 0,25
C315145U	PC	PC SYN+VERT GD33
C106206	P1	RTCAS V 4K7 M 0,15
C106206	P2	RTCAS V 4K7 M 0,15
C106208	P3	RTCAS V 22K M 0,15
C106211	P4	RTCAS V 100K M 0,15
C106208	P5	RTCAS V 22K M 0,15
C106209	P7	RTCAS V 47K M 0,15
C106011	P8	RTCAM V 100K M 0,05
C106207	P9	RTCAS V 10K M 0,15
C106517	P10	RRWW KH 1K K 2
C106013	P12	RTCAM V 470K M 0,05
C131428	Q1	SMCTRA BC 548C
C131428	Q2	SMCTRA BC 548C
C131416	Q3	SMCTRA BC 558B
C131407	Q4	SMCTRA BC 547
C132519	Q5	SMCTRA TIP 33B
C131407	Q6	SMCTRA BC 547
C131428	Q7	SMCTRA BC 548C
C1314071	Q8	SMCTRA BC 547B
C1314451	Q9	SMCTRA BD 238
C132516	Q10	SMCTRA BF 422
C132552	Q11	SMCTRA BF 423
C101148	R1	RRCF 10K J 0,25
C101136	R2	RRCF 1K J 0,25
C101136	R3	RRCF 1K J 0,25
C101162	R4	RRCF 150K J 0,25
C101162	R5	RRCF 150K J 0,25
C101177	R6	RRCF 2M7 K 0,25
C101140	R7	RRCF 2K2 J 0,25
C101140	R8	RRCF 2K2 J 0,25
C101152	R9	RRCF 22K J 0,25
C101171	R10	RRCF 820K J 0,25
C101128	R11	RRCF 220E J 0,25
C101132	R12	RRCF 470E J 0,25
C101129	R13	RRCF 270E J 0,25
C1012259	⚠ SR14	RRCFFUL 120E J 0,50
C101142	R15	RRCF 3K3 J 0,25
C101149	R16	RRCF 12K J 0,25
C101138	R17	RRCF 1K5 J 0,25
C101141	R18	RRCF 2K7 J 0,25
C101141	R19	RRCF 2K7 J 0,25
C101159	R20	RRCF 82K J 0,25
C101134	R21	RRCF 680E J 0,25
C101154	R22	RRCF 33K J 0,25
C1014318	R23	RRCFF 390E K 1,30
C101130	R24	RRCF 330E J 0,25
C1014108	R25	RRCFF 6E8 K 1,30
C103731	R26	RRWW H180E K 5
C101163	R27	RRCF 180K J 0,25
C1011269	⚠ SR28	RRCFFUL 150E J 0,25
C101148	R29	RRCF 10K J 0,25
C101148	R30	RRCF 10K J 0,25
C101154	R31	RRCF 33K J 0,25
C101138	R32	RRCF 1K5 J 0,25
C101165	R33	RRCF 270K J 0,25
C101149	R34	RRCF 12K J 0,25
C101160	R35	RRCF 100K J 0,25
C101154	R36	RRCF 33K J 0,25
C101156	R37	RRCF 47K J 0,25
C101148	R38	RRCF 10K J 0,25
C101136	R39	RRCF 1K J 0,25
C101138	R40	RRCF 1K5 J 0,25
C101160	R41	RRCF 100K J 0,25
C101156	R42	RRCF 47K J 0,25
C101165	R43	RRCF 270K J 0,25
C101160	R44	RRCF 100K J 0,25
C101142	R45	RRCF 3K3 J 0,25
C101144	R46	RRCF 4K7 J 0,25
C101138	R47	RRCF 1K5 J 0,25
C101132	R48	RRCF 470E J 0,25
C101340	R49	RRCF 2K2 J 1
C101148	R50	RRCF 10K J 0,25
C101136	R51	RRCF 1K J 0,25
C101136	R52	RRCF 1K J 0,25
C101156	R53	RRCF 47K J 0,25
C101158	R54	RRCF 68K J 0,25
C101159	R56	RRCF 82K J 0,25
C101156	R56	RRCF 47K J 0,25
C101153	R57	RRCF 27K J 0,25
C101157	R60	RRCF 56K J 0,25
C101153	R61	RRCF 27K J 0,25
C101172	R64	RRCF 1M J 0,25
C10412049	⚠ SR65	RRCFFUL 2E2 J 0,50
C101104	R67	RRCF 2E2 J 0,25
C101168	R68	RRCF 470K J 0,25
C101161	R69	RRCF 120K J 0,25
C101161	R70	RRCF 120K J 0,25
C101132	R71	RRCF 470E J 0,25
C101427	R72	RRCF 180E J 1,50
C101147	R74	RRCF 8K2 J 0,25
C101157	R75	RRCF 56K J 0,25
C101200	R76	RRCF 1E J 0,50
C101150	R77	RRCF 15K J 0,25
C101136	R79	RRCF 1K J 0,25
C101148	R80	RRCF 10K J 0,25
C101152	R82	RRCF 22K J 0,25
C102944	R84	RRMF 4K7 J 1,60
C1011409	⚠ SR85	RRCFFUL 2K2 J 0,25
C101134	R105	RRCF 680E J 0,25
C1011209	⚠ SR106	RRCFFUL 47E J 0,25
C101164	R107	RRCF 220K J 0,25
C101164	R108	RRCF 220K J 0,25
C101136	R109	RRCF 1K J 0,25
C101160	R110	RRCF 100K J 0,25
C131765	Z1	SMCDIOZEN 0.5 B 27
C412625	-	SPRING K 2
C712579	-	heatsink
C605027	-	STRIP 1C2

BARCO INDUSTRIES COMMUNICATIONS

Sync & Vertical Deflection Unit

C660019



P1: HORIZONTAL FREQUENCY

P2: HORIZONTAL PHASE

P7: VERTICAL SHIFT

P13: VERTICAL UNDERSCAN

P4: VERTICAL AMPLITUDE

P12: HORIZONTAL HOLD 50

P3: VERTICAL HOLD 50

P5: S-CORRECTION

P6: VERTICAL LINEARITY

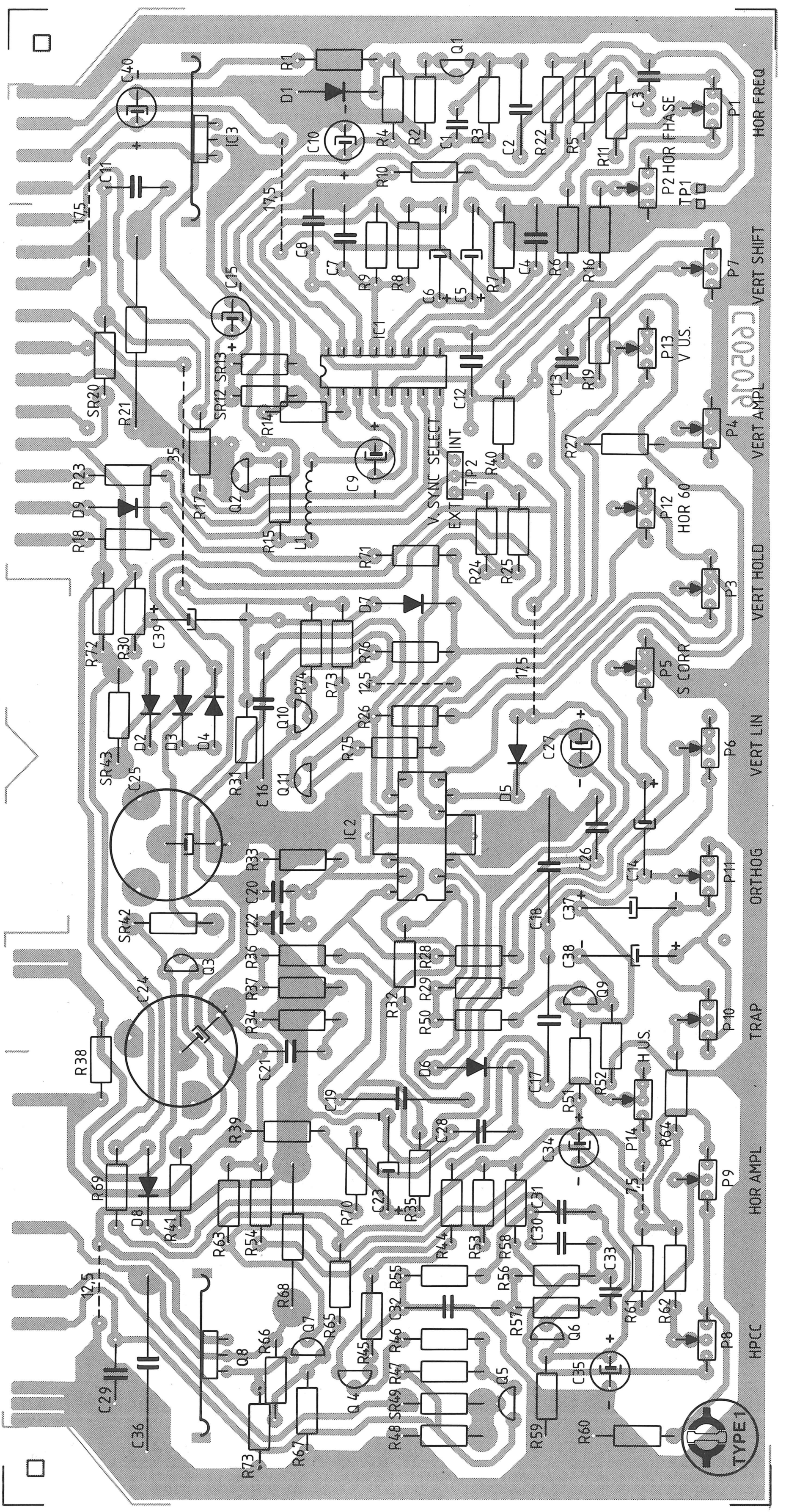
P11: ORTHOGONALITY

P10: TRAPEZIUM CORRECTION

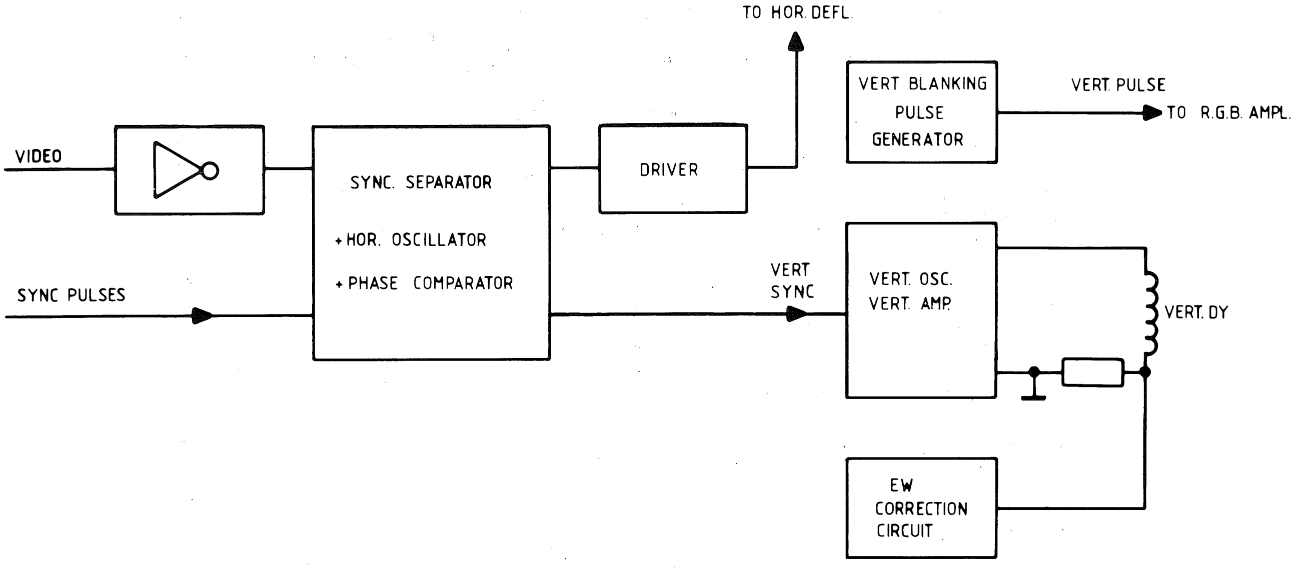
P14: HORIZONTAL UNDERSCAN

P9: HORIZONTAL AMPLITUDE

P8: HORIZONTAL PIN CUSHION CORRECTION


HOR FREQ
P1
P2 HOR PHASE
TP1
VERT SHIFT
P7
P13
V.US.
VERT AMPL
P4
P12
HOR 60
VERT HOLD
P3
P5
S CORR
VERT LIN
P6
ORTHOG
P11
TRAP
P10
H.US.
P14
HOR AMPL
P9
HPCC
P8
TYPE1
V. SYNC SELECT
EXT
INT
TP2
IC1
IC2
IC3
17,5
12,5
7,5

SYNC & VERTICAL DEFLECTION UNIT	C660019	Page nr.: TM012b


TO HOR. DEFL.
VERT BLANKING PULSE GENERATOR
VERT. PULSE
TO R.G.B. AMPL.
VIDEO
SYNC. SEPARATOR
+ HOR. OSCILLATOR
+ PHASE COMPARATOR
DRIVER
SYNC PULSES
VERT SYNC
VERT. OSC.
VERT. AMP.
VERT. DY
EW CORRECTION CIRCUIT

760747U

BLOCK DIAGRAM SYNC & VERT DEFL

MODIFICATIONS RESERVED

19-11-81

DESCRIPTION
===========

The Sync. and vertical deflection unit is built around two I.C.'s: TDA 2593 and TDA 1170.I.C.1. separates the sync. signal from the incoming composite video signal (pin 8). The I.C. contains an oscillator which is controlled by two phase comparators comparing on the one hand the separated sync. pulse and on the other hand the line flyback pulse from the horizontal deflection unit.

The line driver output (pin 2) drives transistor Q2 on this board which in turn drive the horizontal deflection transistor on the Horizontal deflection board.

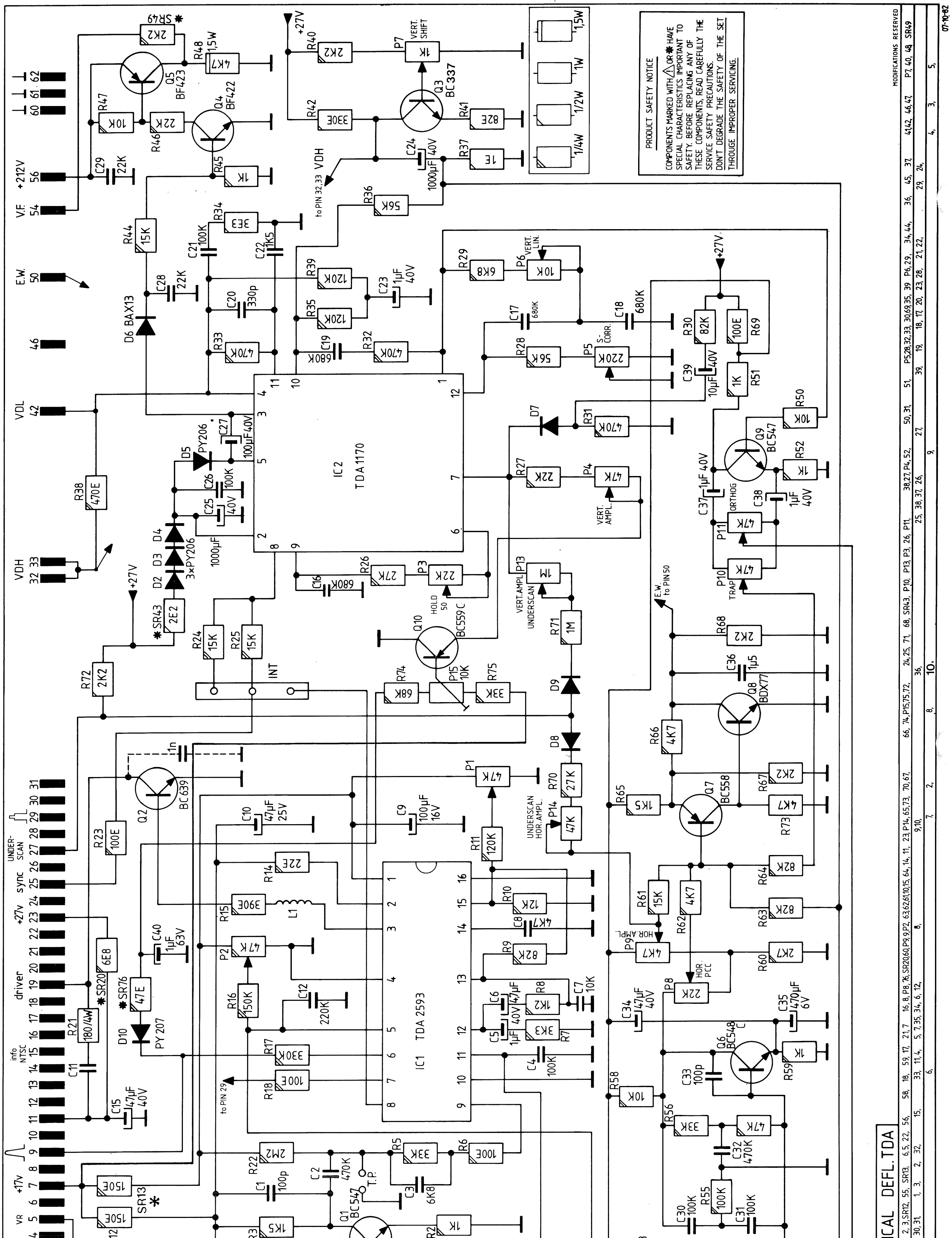
I.C.2. is used to generate the vertical deflection current (output pin 4).

The frequency of the internal oscillator is synchronised with the incoming sync. signal (pin 8) and may be adjusted with P5 (vert. Hold).

Pulses from an internal vertical flyback generator are applied to the yoke via the internal power amplifier. They are also applied to the vertical flyback pulse shaping circuit (Q4, Q5).

A parabolic voltage for east-west correction is formed from the sawtooth waveform found on junction C24-R37 with the circuit containing transistors Q6, Q7 and Q8.

The trapezium distortion, correction and orthogonality correction are formed with transistor Q9 and are adjusted with P10 and P11 resp.


IC1 TDA 2593
IC2 TDA1170
Q1 BC547
Q2 BC639
Q3 BC337
Q4 BF422
Q5 BF423
Q6 BC548C
Q7 BC558
Q8 BDX77
Q9 BC547
Q10 BC559C
D1 BAX13
D2 D3 D4 3×PY206
D5 PY206
D6 BAX13
D10 PY 207
VERT. SHIFT
VERT. LIN.
S-CORR.
VERT. AMPL.
HOLD 50
ORTHOG
TRAP
UNDERSCAN HOR.AMPL.
VERT.AMPL UNDERSCAN
HOR AMPL.
HOR PCC
INT
T.P.
to PIN 32,33 VDH
to PIN 29
E.W. to PIN 50
+27V
+212V
V.F.
E.W.
VDL
VDH
video
VR
+17v
driver
info NTSC
sync
UNDER-SCAN
1/4W
1/2W
1W
1,5W
MODIFICATIONS RESERVED
C660019 VERTICAL DEFL. TDA
07-10-82

PRODUCT SAFETY NOTICE

COMPONENTS MARKED WITH △ OR ✱ HAVE SPECIAL CHARACTERISTICS IMPORTANT TO SAFETY. BEFORE REPLACING ANY OF THESE COMPONENTS, READ CAREFULLY THE SERVICE SAFETY PRECAUTIONS. DONT DEGRADE THE SAFETY OF THE SET THROUGE IMPROPER SERVICING.

SYNC & VERTICAL DEFLECTION UNIT	C660019	Page nr.: TM012d

ADJUSTMENT PROCEDURE

1. THE LINE OSCILLATOR

- short circuit the testpoint TP1 to earth.
- adjust P1 "line freq." in order to get a minimal horizontal beat.
- take away the short circuit.

2. THE VERTICAL OSCILLATOR

- remove strap TP2.
- adjust P3 (vert Hold) to obtain an upwards vertical beat of 3 turns per second approximately.
- reinstall the removable strap.
- adjust P2 (hor phase) to center the picture on the screen.

3. VERTICAL LINEARITY AND DIMENSIONS

- the vertical linearity is adjusted by means of P6 (vert lin). It is advisable to use a test pattern.
- S correction is adjusted with P5.
- the vertical amplitude is adjusted by means of P4 (vert ampl).
- the vertical picture centering is carried out by means of the potentiometer P7 (vert shift).

4. EAST-WEST PIN CUSHION CORRECTION

The deformation of the vertical lines on the left and right side of the screen can be:

- Parabolic deformation: this can be corrected by means of P8 (Hor. PCC).
- Trapezoidal deformation: this can be adjusted by means of P10 (trap dist.).
- Orthogonality deformation: correction is adjusted with P11 (orthog.)

5. HORIZONTAL AMPLITUDE

The horizontal amplitude can be adjusted by means of P9. This adjustment can influence the east-west pin cushion correction so that we must recheck point 4.

6. UNDERSCAN

- Vertical underscan is adjusted by means of P13
- Horizontal underscan is adjusted by means of P14.

PARTS LIST

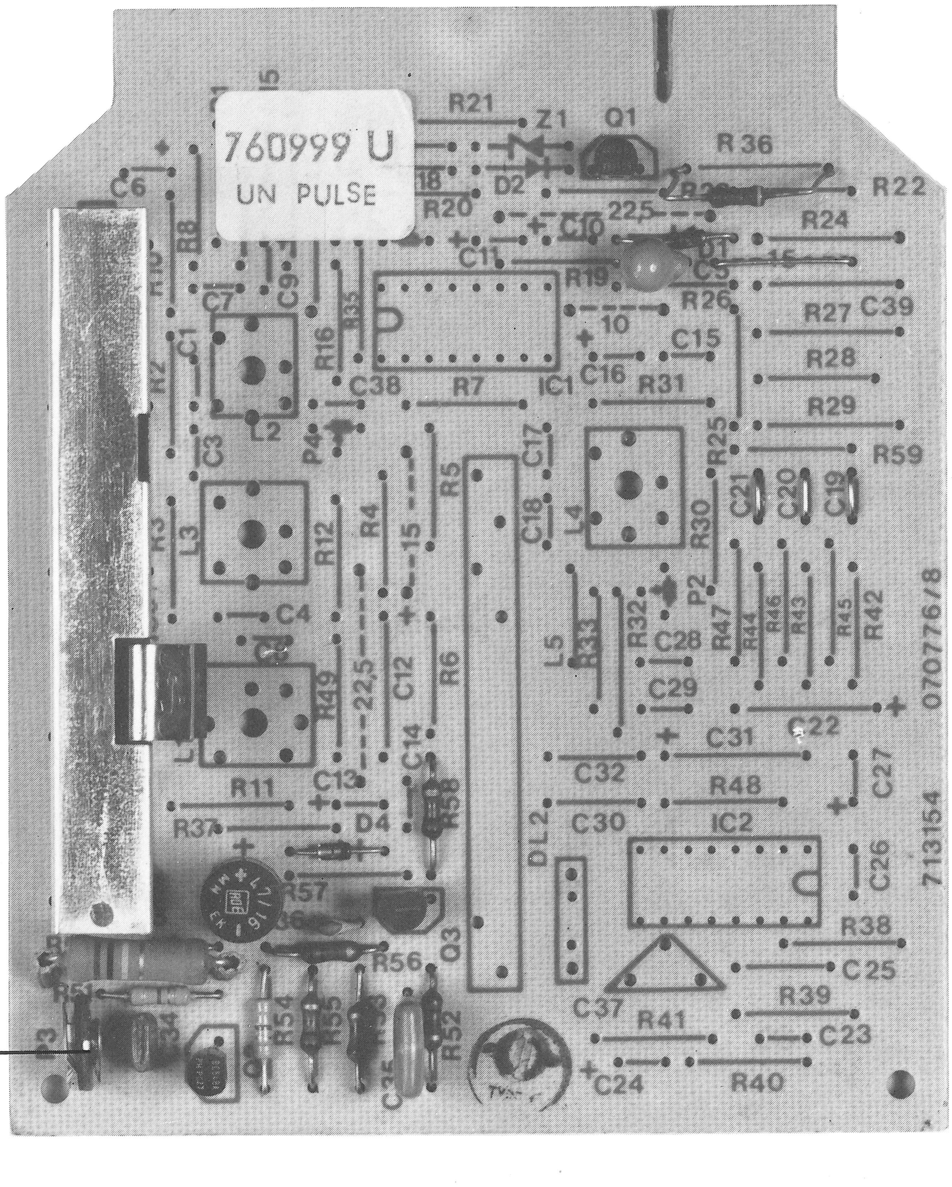
VERTICAL.DEFLECTION UNIT

Part nr.: C660019

REF. NR.	POSITION	DESCRIPTION	REF. NR.	POSITION	DESCRIPTION
C112242	C1	CNPO MI 100P G5 63	C1314182	Q10	SMCTRA BC 559C
C114104	C2	CPOMEFF 470K K 100	C101148	R1	RRCF 10K J 0,25
C112835	C3	CCE DI 6K8 S 400	C101136	R2	RRCF 1K J 0,25
C114100	C4	CPOMEFF 100K K 100	C101138	R3	RRCF 1K5 J 0,25
C1111841	C5	CELAX 1M T 40	C101163	R4	RRCF 180K J 0,25
C111184	C6	CELAX 4M7 Z 40	C101154	R5	RRCF 33K J 0,25
C114120	C7	CPOMEFF 10K K 250	C101124	R6	RRCF 100E J 0,25
C1160505	C8	CPPFFRA 4K7 G 63	C101142	R7	RRCF 3K3 J 0,25
C111466	C9	CELPR 100M Z 16	C101137	R8	RRCF 1K2 J 0,25
C111476	C10	CELPR 47M Z 25	C101159	R9	RRCF 82K J 0,25
C114130	C11	CPOMEFF 68K K 250	C101149	R10	RRCF 12K J 0,25
C114102	C12	CPOMEFF 220K K 100	C101161	R11	RRCF 120K J 0,25
C112747	C13	CCE MI 4K7 K5 63	C1011269	* SR12	RRCFFUL 150E J 0,25
C1111841	C14	CELAX 1M T 40	C1011269	* SR13	RRCFFUL 150E J 0,25
C111486	C15	CELPR 47M Z 40	C101116	R14	RRCF 22E J 0,25
C114142	C16	CPOMEFF 680K K 250	C101131	R15	RRCF 390E J 0,25
C114142	C17	CPOMEFF 680K K 250	C101162	R16	RRCF 150K J 0,25
C114142	C18	CPOMEFF 680K K 250	C101166	R17	RRCF 330K J 0,25
C114944	C19	CPOMEPO 680K M 50	C101124	R18	RRCF 100E J 0,25
C112368	C20	CN750MI 330P G5 63	C101164	R19	RRCF 220K J 0,25
C114100	C21	CPOMEFF 100K K 100	C1011109	* SR20	RRCFFUL 6E8 J 0,25
C112741	C22	CCE MI 1K5 K5 63	C103731	R21	RRWW H180E K 5
C1111841	C23	CELAX 1M T 40	C101176	R22	RRCF 2M2 K 0,25
C111626	C24	CELRA 1000M T 40	C101124	R23	RRCF 100E J 0,25
C111626	C25	CELRA 1000M T 40	C101150	R24	RRCF 15K J 0,25
C114100	C26	CPOMEFF 100K K 100	C101150	R25	RRCF 15K J 0,25
C111487	C27	CELPR 100M Z 40	C101153	R26	RRCF 27K J 0,25
C114124	C28	CPOMEFF 22K K 250	C101152	R27	RRCF 22K J 0,25
C114124	C29	CPOMEFF 22K K 250	C101157	R28	RRCF 56K J 0,25
C114100	C30	CPOMEFF 100K K 100	C101147	R29	RRCF 8K2 J 0,25
C114100	C31	CPOMEFF 100K K 100	C101159	R30	RRCF 82K J 0,25
C114104	C32	CPOMEFF 470K K 100	C101168	R31	RRCF 470K J 0,25
C112242	C33	CNPO MI 100P G5 63	C101168	R32	RRCF 470K J 0,25
C111486	C34	CELPR 47M Z 40	C101168	R33	RRCF 470K J 0,25
C111452	C35	CELPR 470M Z 6,	C101206	R34	RRCF 3E3 J 0,50
C114146	C36	CPOMEFF 1M5 K 250	C101161	R35	RRCF 120K J 0,25
C1111841	C37	CELAX 1M T 40	C101157	R36	RRCF 56K J 0,25
C1111841	C38	CELAX 1M T 40	C101200	R37	RRCF 1E J 0,50
C1111851	C39	CELAX 10M Z 40	C101132	R38	RRCF 470E J 0,25
C1111841	C40	CELAX 1M T 40	C101161	R39	RRCF 120K J 0,25
C131621	D1	SMCDIO BAX 13	C101140	R40	RRCF 2K2 J 0,25
C131911	D2	SMCDIOREC PY 206	C101223	R41	RRCF 82E J 0,50
C131911	D3	SMCDIOREC PY 206	C101230	R42	RRCF 330E J 0,50
C131911	D4	SMCDIOREC PY 206	C1012049	* SR43	RRCFFUL 2E2 J 0,50
C131911	D5	SMCDIOREC PY 206	C101150	R44	RRCF 15K J 0,25
C131621	D6	SMCDIO BAX 13	C101136	R45	RRCF 1K J 0,25
C131621	D7	SMCDIO BAX 13	C101152	R46	RRCF 22K J 0,25
C131621	D8	SMCDIO BAX 13	C101148	R47	RRCF 10K J 0,25
C131621	D9	SMCDIO BAX 13	C102944	R48	RRMF 4K7 J 1,60
C131910	D10	SMCDIO PY 207	C1011409	* SR49	RRCFFUL 2K2 J 0,25
C132748	IC1	SMCICLOSE TDA2593	C101148	R50	RRCF 10K J 0,25
C132164	IC2	SMCICLWBA TDA1170	C101136	R51	RRCF 1K J 0,25
C773054	L1	SPON 32,5 RK 1,6 D0,25	C101136	R52	RRCF 1K J 0,25
C605016	PC	PC -660019	C101165	R53	RRCF 270K J 0,25
C1062091	P1	RTCAPPV 47K M 0,20	C101149	R54	RRCF 12K J 0,25
C1062091	P2	RTCAPPV 47K M 0,20	C101160	R55	RRCF 100K J 0,25
C1062081	P3	RTCAPPV 22K M 0,20	C101154	R56	RRCF 33K J 0,25
C1062091	P4	RTCAPPV 47K M 0,20	C101156	R57	RRCF 47K J 0,25
C1062121	P5	RTCAPPV 220K M 0,20	C101148	R58	RRCF 10K J 0,25
C1062071	P6	RTCAPPV 10K M 0,20	C101136	R59	RRCF 1K J 0,25
C1062041	P7	RTCAPPV 1K M 0,20	C101141	R60	RRCF 2K7 J 0,25
C1062081	P8	RTCAPPV 22K M 0,20	C101150	R61	RRCF 15K J 0,25
C1062061	P9	RTCAPPV 4K7 M 0,20	C101144	R62	RRCF 4K7 J 0,25
C1062091	P10	RTCAPPV 47K M 0,20	C101159	R63	RRCF 82K J 0,25
C1062091	P11	RTCAPPV 47K M 0,20	C101159	R64	RRCF 82K J 0,25
C1062141	P13	RTCAPPV 1M M 0,20	C101138	R65	RRCF 1K5 J 0,25
C1062091	P14	RTCAPPV 47K M 0,20	C101144	R66	RRCF 4K7 J 0,25
C106007	P15	RTCAM V 10K M 0;05	C101140	R67	RRCF 2K2 J 0,25
C131407	Q1	SMCTRA BC 547	C101340	R68	RRCF 2K2 J 1
C132562	Q2	SMCTRA BC 639	C101124	R69	RRCF 100E J 0,25
C131426	Q3	SMCTRA BC 337	C101153	R70	RRCF 27K J 0,25
C132516	Q4	SMCTRA BF 422	C101172	R71	RRCF 1M J 0,25
C132552	Q5	SMCTRA BF 423	C101240	R72	RRCF 2K2 J 0,50
C131428	Q6	SMCTRA BC 548C	C101144	R73	RRCF 4K7 J 0,25
C131415	Q7	SMCTRA BC 558	C101158	R74	RRCF 68K J 0,25
C132570	Q8	SMCTRA BDX 77	C101154	R75	RRCF 33K J 0,25
C131407	Q9	SMCTRA BC 547	C1011209	R76	RRCFFUL 47E J 0,25

Pulse Unit

C760999U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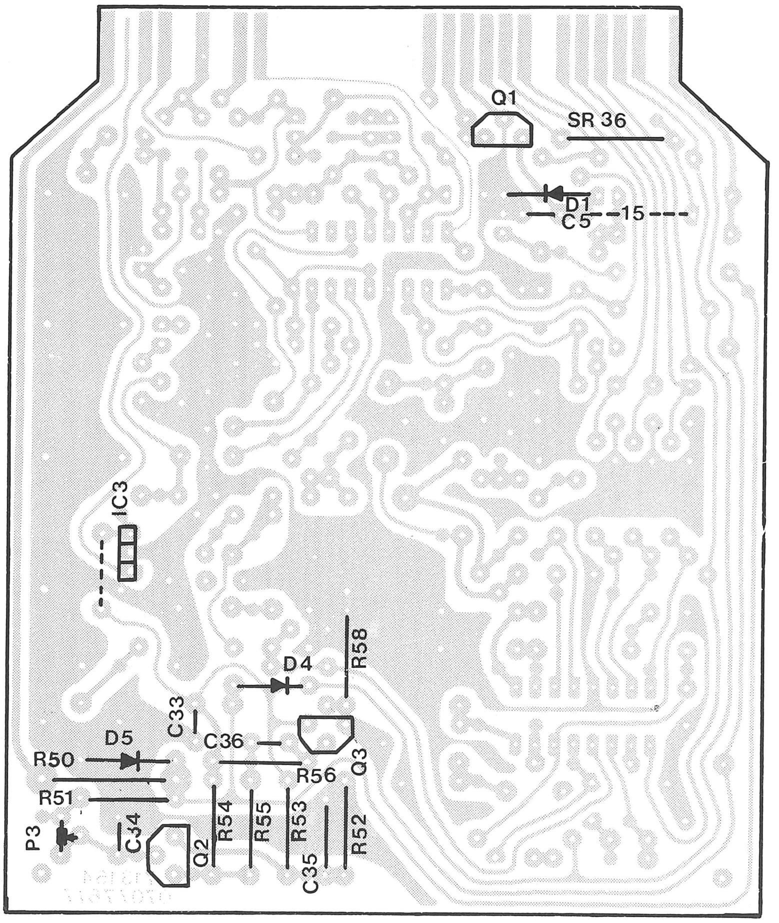
UN PULSE
070776/8
713154

P3: Adjustment position pulse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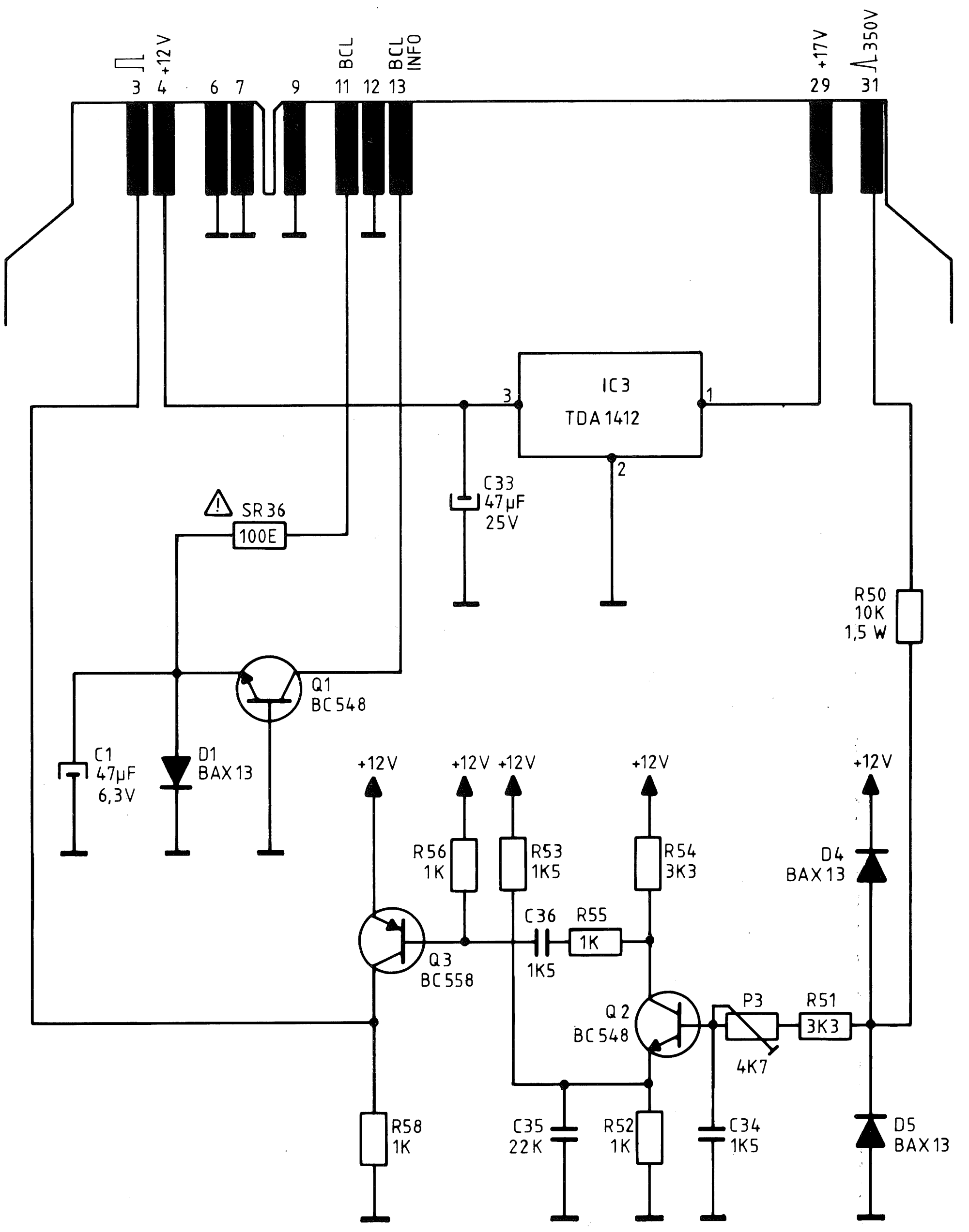
D1
C5
15
IC3
R58
D4
C33
C36
D5
R50
R56
Q3
R51
P3
C34
R54
R55
R53
R52
Q2
C35

PULSE UNIT	C760999U	Page nr.: TM013b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BCL
BCL
INFO
3
4
6
7
9
11
12
13
+17V
350V
29
31
IC3
TDA 1412
3
1
2
C33
47µF
25V
SR 36
100E
R50
10K
1,5 W
Q1
BC 548
C1
47µF
6,3V
D1
BAX 13
+12V
+12V
+12V
+12V
+12V
R56
1K
R53
1K5
R54
3K3
D4
BAX 13
C36
R55
1K
1K5
Q3
BC 558
Q2
BC 548
P3
4K7
R51
3K3
R58
1K
C35
22K
R52
1K
C34
1K5
D5
BAX 13

760999U

PULSE UNIT

MODIFICATIONS RESERVED

16-12-81

PRODUCT SAFETY NOTICE

Components marked with ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully the service safety precautions.

DESCRIPTION DIAGRAM

The pulse unit provides a clamping pulse for the RGB amplifier.

Flyback pulses of approximately 300 Vpp are clamped between ground and + 12 V by D4 and D5. They trigger the monostable multivibrator (Q2 and Q3) via the delay network R51, P3 and C34. P3 determines the position of the output pulse with respect to the line flyback pulse.

Q1 is part of the beam current limiting circuit. The (negative) voltage across R1 on the horizontal deflection board (proportional to the beam current) is applied via pin 11 to the emitter of Q1. When this voltage exceeds 0.6 V, Q1 conducts and the control voltages for contrast and brightness, on the RGB amplifier board, are decreased by Q1 via pin 13.

IC3 provides a regulated + 12 V voltage to the RGB amplifier board.

ADJUSTMENT PROCEDURE

- Connect the sync input signal (or composite green signal) to one channel of the oscilloscope.
- Connect the second channel to the pulse output (pin 3 or collector of Q3).
- Adjust potentiometer P3 so, that the leading edge of the sandcastle pulse starts just after the trailing edge of the sync signal.

NOTE:

It is important to readjust the pulse unit every time the phase adjustment on the vertical deflection board is changed.

Readjust first the phase control, then the pulse unit.

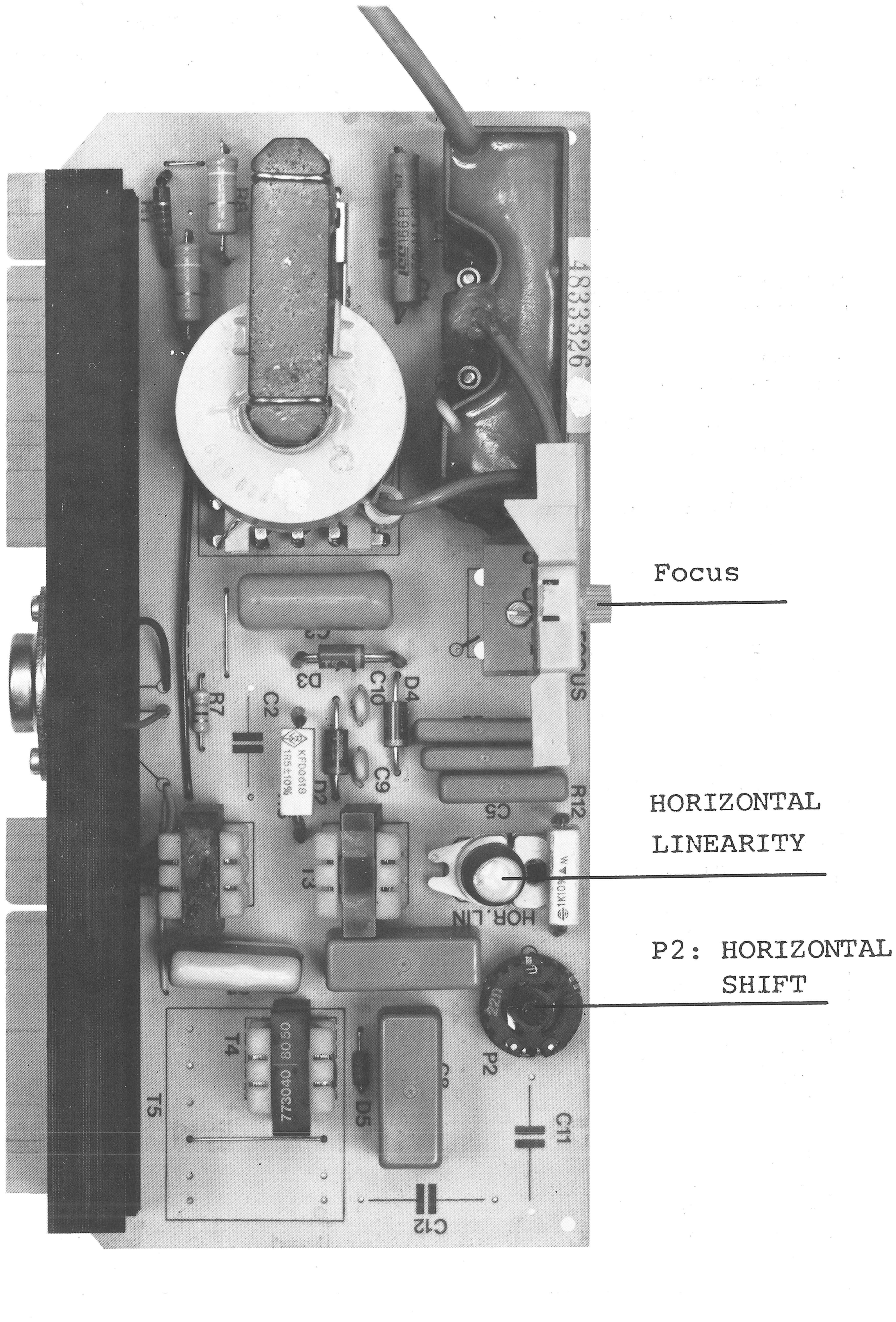
PARTS LIST
PULSE UNIT
Part nr.: C760999U

REF.NR.	POSITION	DESCRIPTION	REF.NR.	POSITION	DESCRIPTION
C111846	C1	CELTA 47M S 6	C1011249	⚠ SR36	RRCFFUL100E J 0,25
C111465	C33	CELPR 47M Z 16	C103248	R50	RRMO 10K J 1,50
C1159201	C34	CPP RA 1K5 J 160	C101142	R51	RRCF 3K3 J 0,25
C114124	C35	CPOMEFF 22K K 250	C101136	R52	RRCF 1K J 0,25
C112754	C36	CCE MI 1K U5 63	C101138	R53	RRCF 1K5 J 0,25
C131621	D1	SMCDIO BAX13	C101142	R54	RRCF 3K3 J 0,25
C131621	D4	SMCDIO BAX13	C101136	R55	RRCF 1K J 0,25
C131621	D5	SMCDIO BAX13	C101136	R56	RRCF 1K J 0,25
C106006	P3	RTCAM V 4K7 M 0,05	C101136	R58	RRCF 1K J 0,25
C131421	Q1	SMCTRA BC 548	C713224	-	SCREEN DELAY LINE
C131421	Q2	SMCTRA BC 548	C133032	-	SMC FIX TO126
C131415	Q3	SMCTRA BC 558	C713154U	PC	PC
C134006	IC3	SMCICLVOL TDA1412			

Horizontal Deflection & EHT Generator

C761000U

Used in high resolution versions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HORIZONTAL LINEARITY
P2: HORIZONTAL SHIFT
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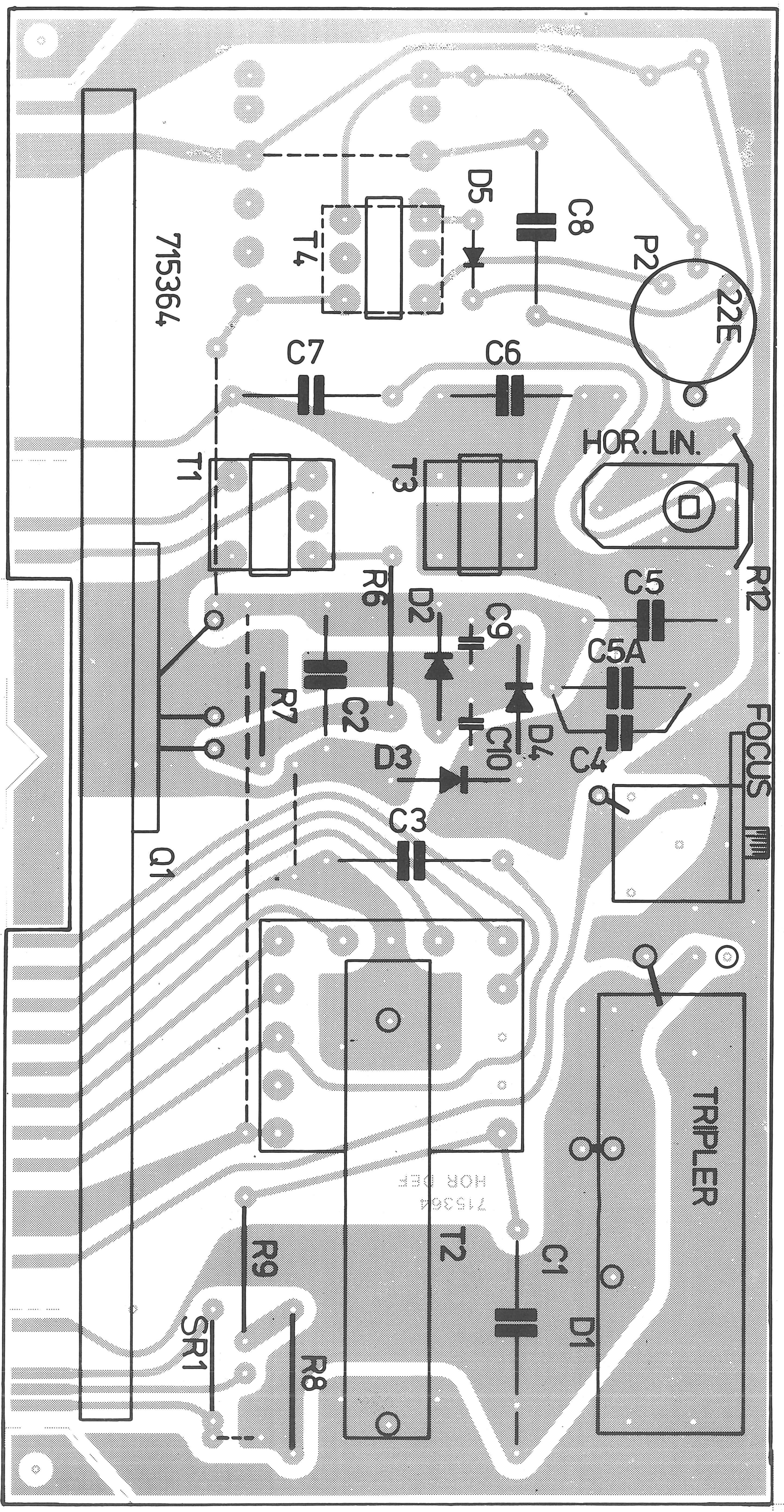
FOCUS
C3
D3
C10
D4
R7
C2
C9
D2
KFD0618
1n5±10%
C5
R12
I3
HOR.LIN
P2
22n
T4
773040
80.50
D5
T5
C11
C12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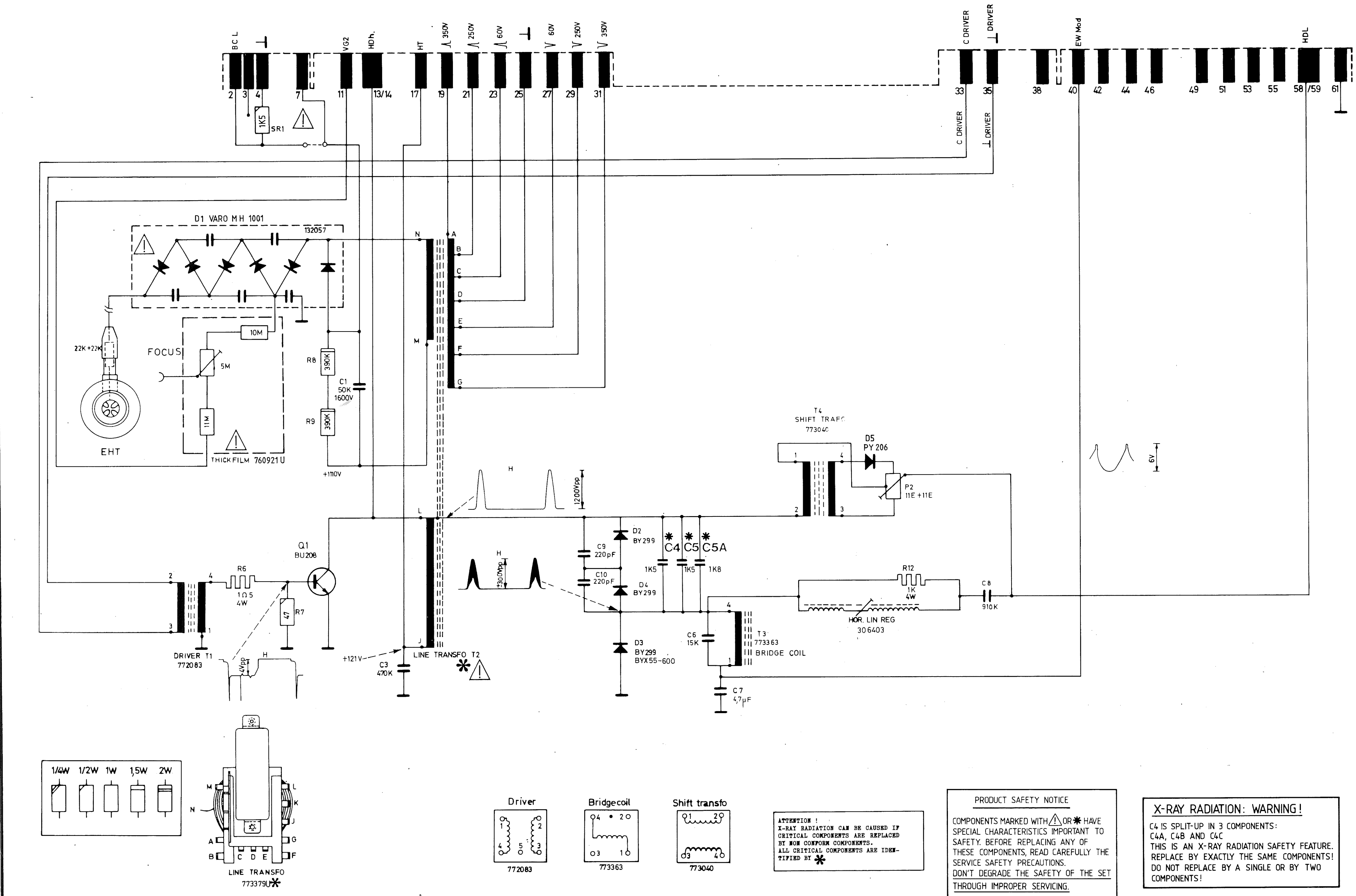
T4
D5
C8
P2
22E
C7
C6
HOR.LIN.
T1
T3
R12
C5
R6
D2
C9
C5A
R7
C2
D4
C10
D3
C4
FOCUS
C3
Q1
TRIPLER
715364
HOR DEF
T2
C1
R9
SR1
R8
D1

HORIZONTAL DEFLECTION & EHT GENERATOR

C761000U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2
3
4
1K5
SR1
7
11
VG2
13/14
HDh.
17
HT
19
350V
21
250V
23
60V
25
27
60V
29
250V
31
350V
33
C DRIVER
35
DRIVER
38
40
EW Mod
42
44
46
49
51
53
55
58/59
HDL
61
D1 VARO M H 1001
132057
10M
FOCUS
5M
11M
THICK FILM 760921U
22K+22K
EHT
R8
390K
R9
390K
C1
50K
1600V
+110V
N
M
A
B
C
D
E
F
G
H
1200Vpp
L
J
LINE TRANSFO T2
+121V
C3
470K
Q1
BU208
R6
1Ω5
4W
R7
47
DRIVER T1
772083
4Vpp
130Vpp
C9
220pF
C10
220pF
D2
BY299
D4
BY299
D3
BY299
BYX55-600
C4
C5
C5A
1K5
1K5
1K8
C6
15K
T3
773363
BRIDGE COIL
C7
4,7μF
R12
1K
4W
HOR. LIN REG
306403
C8
910K
T4
SHIFT TRAFO
773040
D5
PY 206
P2
11E+11E
6V
1/4W
1/2W
1W
1,5W
2W
LINE TRANSFO
773379U
Driver
772083
Bridgecoil
773363
Shift transfo
773040

ATTENTION !
X-RAY RADIATION CAN BE CAUSED IF CRITICAL COMPONENTS ARE REPLACED BY NON CONFORM COMPONENTS.
ALL CRITICAL COMPONENTS ARE IDENTIFIED BY *

PRODUCT SAFETY NOTICE

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DON'T DEGRADE THE SAFETY OF THE SET THROUGH IMPROPER SERVICING.

X-RAY RADIATION: WARNING!

C4 IS SPLIT-UP IN 3 COMPONENTS:
C4A, C4B AND C4C
THIS IS AN X-RAY RADIATION SAFETY FEATURE.
REPLACE BY EXACTLY THE SAME COMPONENTS!
DO NOT REPLACE BY A SINGLE OR BY TWO COMPONENTS!

DESCRIPTION

This unit is equipped with the output transistor BU 208 for the deflection and a diode modulator for East-West raster correction.

A non-linear cushion distortion is caused by the horizontal deflection coils, so a EW-correction should be modulated on the deflection current in order to obtain vertical lines in the screen.

The EHT is generated by the voltage multiplier D1, which gets approximately 7 kV pulses from the line transformer.

Together with R8, R9 and C1, an internal diode in the voltage multiplier forms a clamping circuit. This circuit avoids ringing on the screen after line flyback.

It also causes a decreasing of the internal resistance of the voltage multiplier so that variations of the picture dimensions are minimal.

The rectified scan voltage is used as Vg2 voltage.

The second secondary winding of the line transformer delivers positive and negative line flyback pulses.

The East-West correction is obtained by using a diode modulator which modulates the deflection current. The flyback pulses, however, are not modulated.

The diode modulator is driven on the bridge coil with a parabolic signal on field frequency coming from the driver circuit on the sync. and vertical deflection unit.

ADJUSTMENT PROCEDURE

Horizontal centering P2 "Hor shift"

Adjust the horizontal position of the picture with P2.

Be sure that the horizontal amplitude is correct.

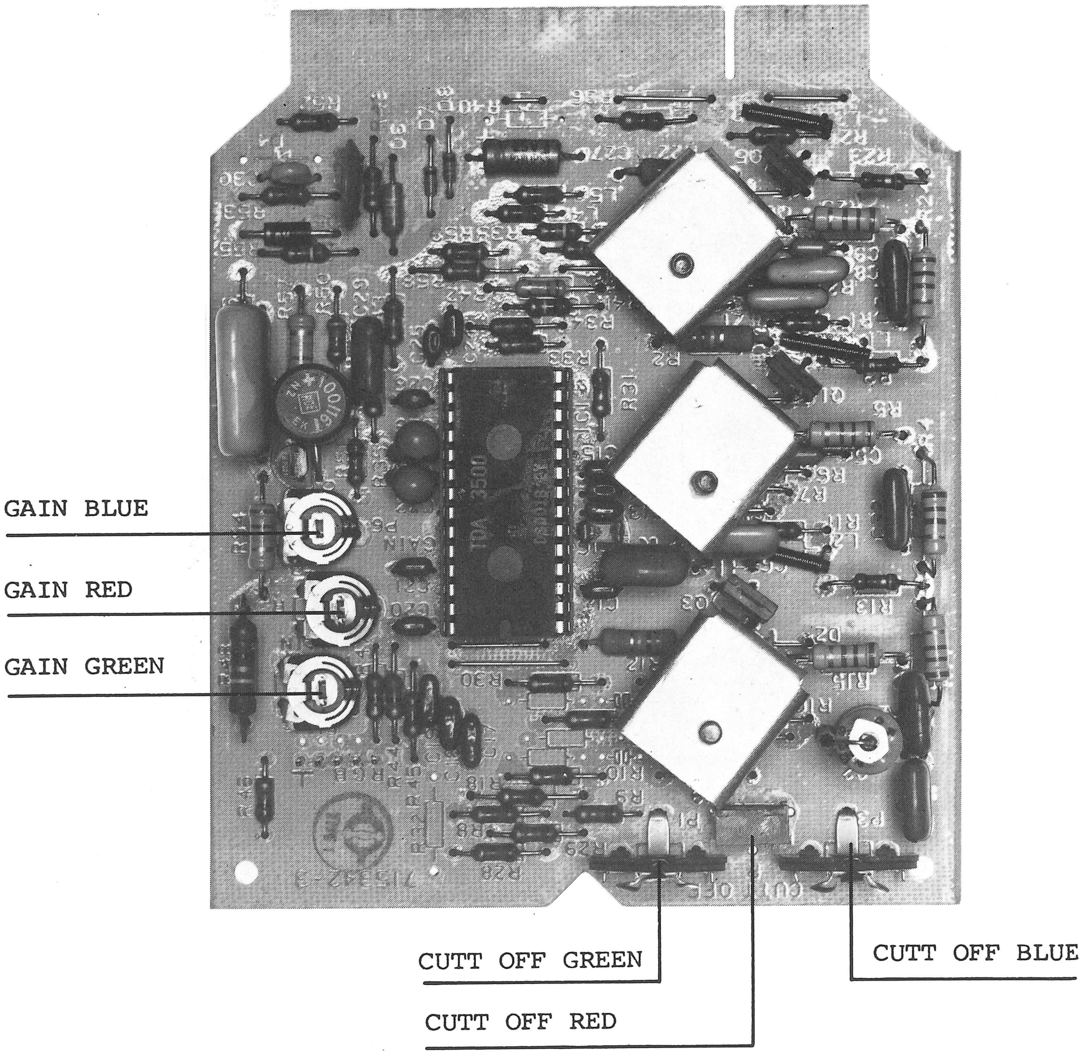
NOMINAL EHT VOLTAGE OF HR-versions is 23 KV (MEDIUM BRIGHTNESS). THE EHT VOLTAGE DEPENDS ON CORRECT ADJUSTMENT OF THE + OUTPUT VOLTAGE OF THE SM POWER SUPPLY BOARD. See board 7602286 for adjustment procedure (P1). EHT voltage never exc-eds 27 KV (0 BEAM CURRENT).

PARTS LIST
SWITCHED MODE POWER SUPPLY
Part nr.: C760228U

REF. NR.	POSITION	DESCRIPTION
C114636	C1	C HV 50K M 1600
C114442	C3	CPO FF 470K K 250
C111761	* C4	CPP DD 1K5 J 1500
C111761	* C5	CPP DD 1K5 J 1500
C111760	* C5A	CPP DD 1K J 1500
C1117221	C6	CPP DD 15K J 1500
C114110	* C7	CPOMEFF 4M7 K 100
C1145961	* C8	CPP P0910K K 250
C112094	C9	CCE DI 220P K 750
C112094	C10	CCE DI 220P K 750
C132069	⚠ D1	SMCTRI MH1001
C131921	D2	SMCDIOREC BY 299
C131924	D3	SMCDIOREC BYX 55-6
C131921	D4	SMCDIOREC BY 299
C131911	D5	SMCDIOREC PY 206
C715364	PC	PC/HOR/DEFL.
C1066015	P2	RTWT 22E K2
C132509	Q1	SMCTRA BU 208A
C1012389	⚠ SR1	RRCFFUL 1K5 J 0,50
C103614	R6	RRWW H 1E5 K 4
C101220	R7	RRCF 47E J 0,50
C101467	* R8	RRCF 390K J 1,50
C101467	* R9	RRCF 390K J 1,50
C103660	* R12	RRWW H 1K K 4
C772083	* T1	TRFDRIVER
C773379U	* ⚠ T2	TRF LINE OUTPUT
C773363	T3	SPORBRIDGE
C773040	T4	TRFSHIFT L1903728
C306403	-	LINE C 4042/02
C714606	-	HEATSINK - 761000
C712604	-	KERN FEROX D2/SL10
C760921U	⚠ -	UN FOCUS ADJ

RGB Out Unit

C761001U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GAIN RED
GAIN GREEN
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CUTT OFF RED
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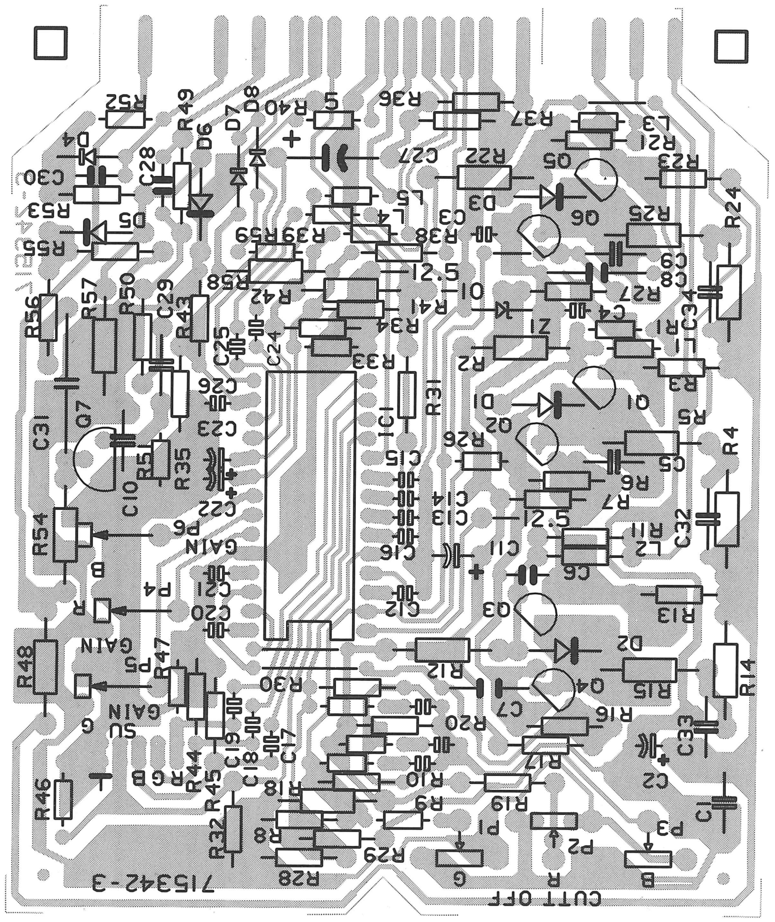
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R
G
B
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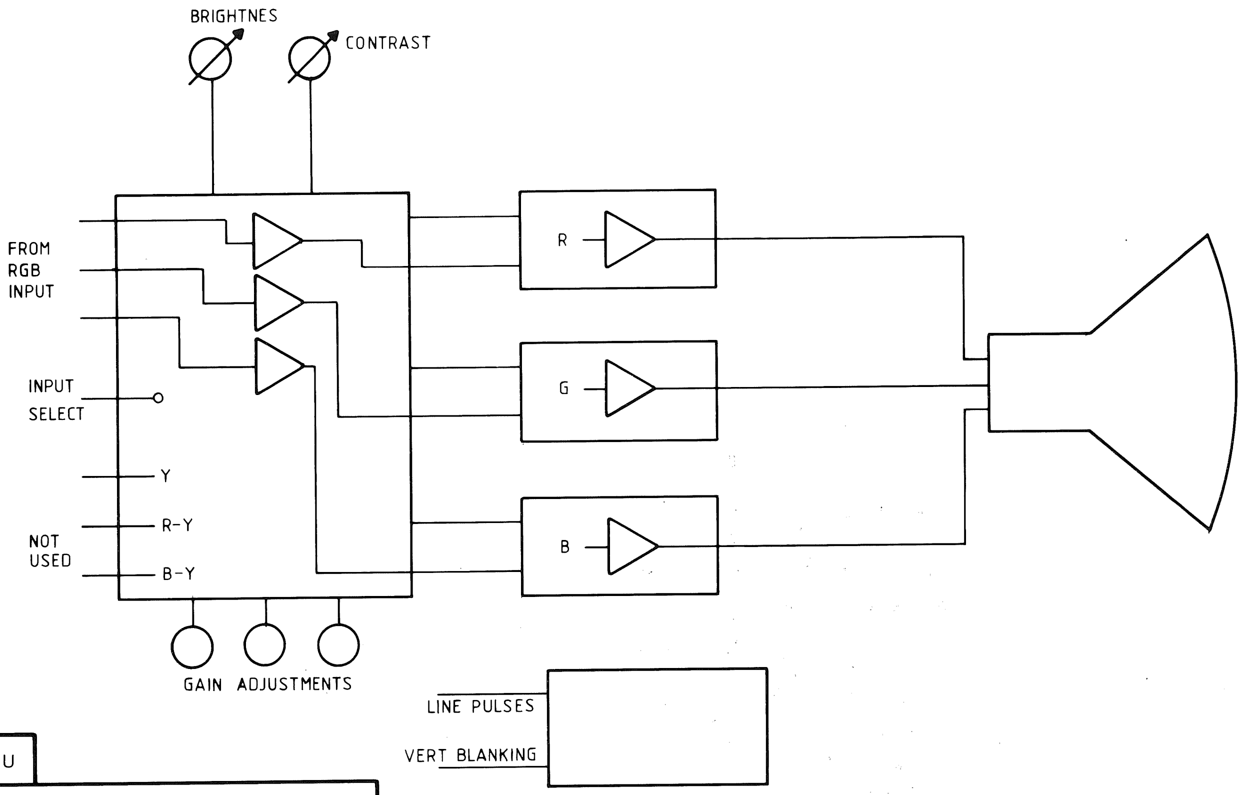
RGB AMPLIFIER



761001U

BLOCK DIAGRAM RGB OUTPUT UNIT

MODIFICATIONS RESERVED

18-12-81

Three functions are performed on this unit, the control of the R, G and B signals, the output amplification of these signals and the processing of the G1 blanking signal.

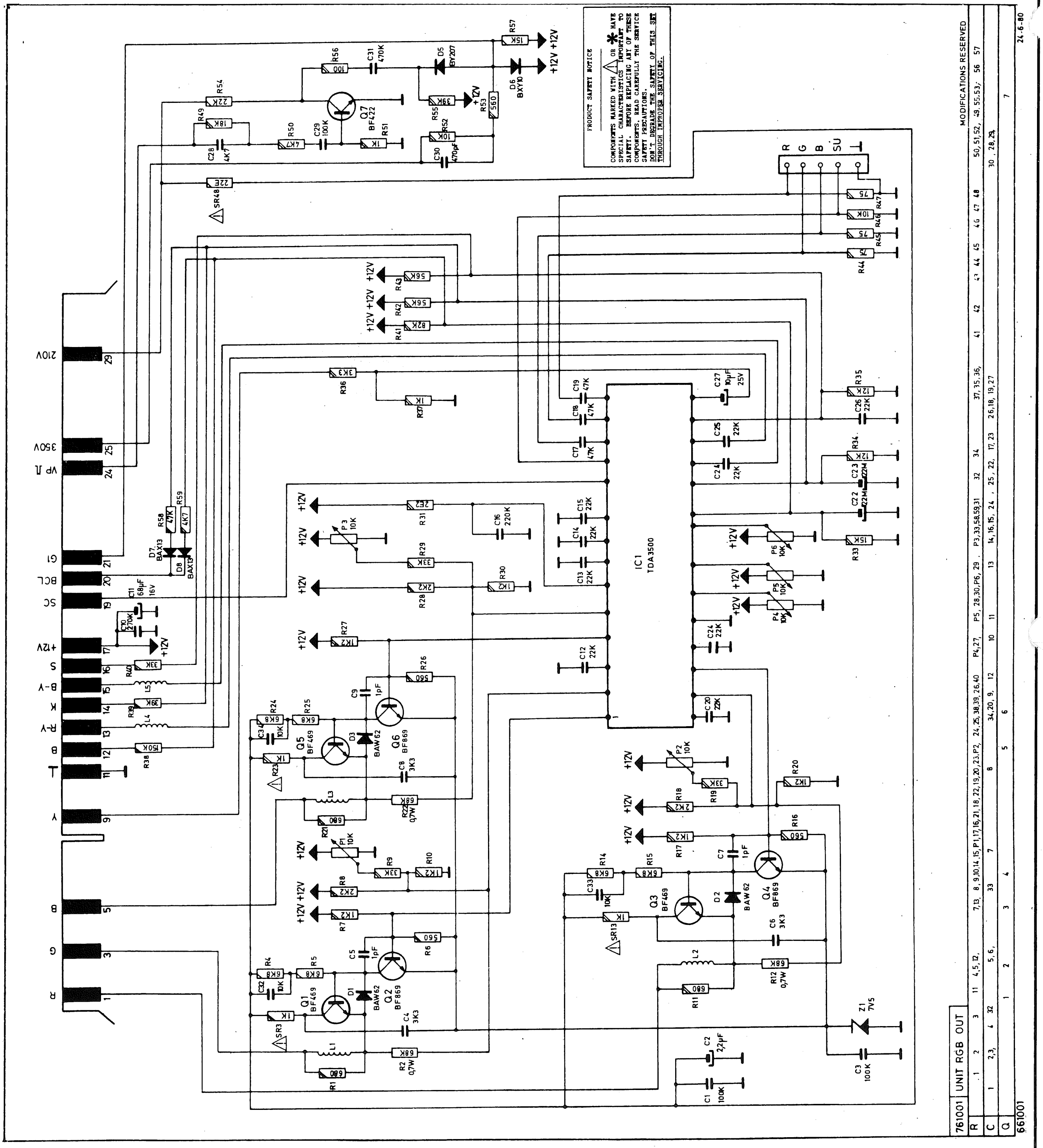
With IC1 (TDA 3500) a choice of input signal is available. Either R-Y, B-Y and Y input signals may be selected or R, G and B signals. This selection is carried out with the SU line which is connected to pin 11 of the I.C.

In this application, however, the R, G and B inputs (pins 14, 13 and 12 respectively) are selected by holding the SU input at a high level via R85 on the input module. These signals are then clamped using the sandcastle pulse (pin 10). Brightness and contrast control voltages are applied to pins 20 and 19 respectively. The three potentiometers P4, P5 and P6 are the cut-off controls for the red, green and blue signals respectively while the capacitors C13, C14 and C15 are the clamping capacitors for the blue, green and red signals.

The end stage is the same for each of the three colours and consists of class AB active load amplifiers.

Potentiometers P1 is the gain control for the green signal, P2 is for the red signal and P3 is for the blue signal.

Q7 and its associated circuitry forms the G1 blanking pulses from the 350 Volt line flyback pulses and the vertical blanking pulses.



R
G
B
Y
R-Y
K
B-Y
S
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SC
BCL
G1
VP Л
350V
210V
IC1
TDA3500
Q1 BF469
Q2 BF869
Q3 BF469
Q4 BF869
Q5 BF469
Q6 BF869
Q7 BF422
D1 BAW62
D2 BAW62
D3 BAW62
D5 BY207
D6 BXY10
D7 BAX13
D8 BAX13
Z1 7V5
P1 10K
P2 10K
P3 10K
P4 10K
P5 10K
P6 10K
SR3
SR13
SR23
SR48 22E
R
G
B
SU
761001 UNIT RGB OUT
661001
MODIFICATIONS RESERVED
24-6-80
R: 1 2 3 11 4,5,12, 7,13, 8, 9,10,14,15,P1,17,16,21,18,22,19,20,23,P2, 24,25,38,39,26,40 P4,27, P5, 28,30,P6, 29 , P3,33,58,59,31 32 34 37,35,36, 41 42 43 44 45 46 47 48 50,51,52, 49,55,53, 56 57
C: 1 2,3, 4 32 5,6, 33 7 8 34,20, 9, 12 10 11 13 14,16,15, 24 , 25 , 22, 17,23 26,18, 19,27 30 , 28,29
Q: 1 2 3 4 5 6 7

PRODUCT SAFETY NOTICE

COMPONENTS MARKED WITH ⚠ OR ✱ HAVE SPECIAL CHARACTERISTICS IMPORTANT TO SAFETY. BEFORE REPLACING ANY OF THESE COMPONENTS, READ CAREFULLY THE SERVICE SAFETY PRECAUTIONS.
DON'T DEGRADE THE SAFETY OF THIS SET THROUGH IMPROPER SERVICING.

RGB. AMPLIFIER	C761001U	Page nr.: TM017d

ADJUSTMENT PROCEDURE

Two methods exist for adjusting the gain and cut-off potentiometers (high and low lights). The first method is very precise but requires a correctly adjusted colour analyzer and a white and black window generator.

The second method is not very accurate but only requires a voltmeter and a normal generator. The color temperature is correctly set in the factory. It is recommended that - unless it is absolutely necessary - the potentiometers be left unchanged.

The first five steps are common to both methods.

1. Turn the cut-off (Lo) and gain (Hi) potentiometers completely anticlockwise (minimum light output).
2. Turn each of the gain potentiometers 1/3 of their range clockwise.
3. Switch on the set and apply a grey scale.
4. Place the contrast and the brightness in their mid-position.
5. Adjust the G2 potentiometer on the CRT socket so that the darkest grey bar just becomes visible. The black bar may not be visible.

FIRST METHOD

6. Allow the monitor to warm up for at least 30 minutes.
7. Fix the head of the color analyzer (e.g. a Philips PM 5529 graduated for 6500 K for the picture tube in question) to the centre of the screen.
8. Shield the screen from incident light.
9. Apply the black window signal (sync + 55 mV video).
10. Place the contrast potentiometer in its mid-position.
11. Using the oscilloscope, adjust the brightness so that the black level is the same as the clamp level.
12. The three cut-off potentiometers (P4, P5, P6) are now adjusted to give 0.3 nit for each color on the 1 nit scales of the analyzer (for the PM 5529 the last two buttons pressed in).
13. Apply the white window signal (sync. + 700 mV).
14. Adjust the three gain potentiometers (P1, P2, P3) to give 80 nit for each color on the 100 nit scales.
15. Check the tracking by adjusting the contrast from 80 nit to 0.3 nit and seeing that the movement of the 3 meters coincide. If not repeat the adjustments.

SECOND METHOD

6. Adjust the cut-off potentiometers to obtain a good grey scale.
7. The gain potentiometers should be adjusted to obtain a voltage of 35 Vpp measured on R, G and B outputs.

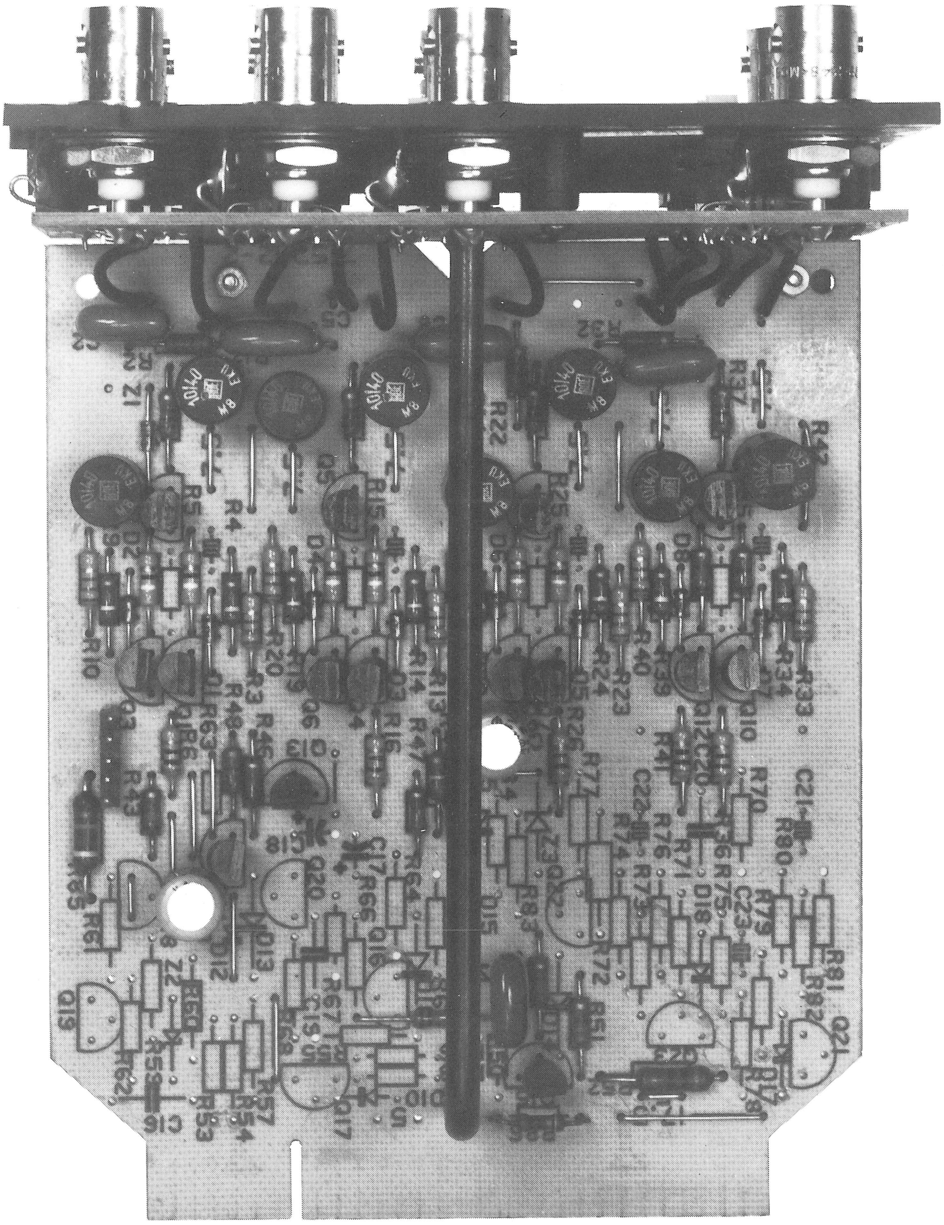
REF.NR.	POSITION	DESCRIPTION
C114132	C1	CPOMEFF100K K 250
C111571	C2	CELPR 2M2 T 350
C112774	C3	CCE MI 100K U5 63
C114128	C4	CPOMEFF 47K K 250
C1120711	C5	CN750 PE 1P C 400
C114128	C6	CPOMEFF 47K K 250
C1120711	C7	CN750 PE 1P C 400
C114128	C8	CPOMEFF 47K K 250
C1120711	C9	CN750PE 1P C 400
C111466	C10	CELPR 100M Z 16
C114102	C11	CPOMEFF220K K 100
C112770	C12	CCE MI 22K U5 63
C112770	C13	CCE MI 22K U5 63
C112770	C14	CCE MI 22K U5 63
C112770	C15	CCE MI 22K U5 63
C113841	C16	CPETPFP220K M 63
C112772	C17	CCE MI 47K U5 63
C112772	C18	CCE MI 47K U5 63
C112772	C19	CCE MI 47K U5 63
C112770	C20	CCE MI 22K U5 63
C112770	C21	CCE MI 22K U5 63
C111884	C22	CELTA 22M S 16
C111884	C23	CELTA 22M S 16
C112770	C24	CCE MI 22K U5 63
C112770	C25	CCE MI 22K U5 63
C112770	C26	CCE MI 22K U5 63
C111156	C27	CELAX 10M Z 25
C112833	C28	CCE DI 4K7 S 400
C114132	C29	CPOMEFF100K K 250
C112821	C30	CCE DI470P M 400
C114140	C31	CPOMEFF470K K 250
C114120	C32	CPOMEFF 10K K 250
C114120	C33	CPOMEFF 10K K 250
C114120	C34	CPOMEFF 10K K 250
C131628	D1	SMCDIO BAW 62
C131628	D2	SMCDIO BAW 62
C131628	D3	SMCD10 BAW 62
C131910	D5	SMCD10REC BY 207
C131920	D6	SMCD10REC BYX 10
C131621	D7	SMCDIO BAX 13
C131621	D8	SMCD10 BAX 13
C132734	IC 1	SMCICL 3500
C773054	L 1	SPON 32,5 RK1,600,25
C773054	L 2	SPON 32,5 RK1,600,25
C773054	L 3	SPON 32,5 RK1,600,25
C106207	P 1	RTCAS V 10K M 0,15
C106829	P 2	RTCEM V 10K K 0,50
C106207	P 3	RTCAS V 10K M 0,15
C1061075	P 4	RTCAM H 10K M 0,05
C1061075	P 5	RTCAM H 10K M 0,05
C1061075	P 6	RTCAM H 10K M 0,05
C1325145	Q 1	SMCTRA BF 469
C1325146	Q 2	SMCTRA BF 869
C1325145	Q 3	SMCTRA BF 469
C1325146	Q 4	SMCTRA BF 869
C1325145	Q 5	SMCTRA BF 469
C1325146	Q 6	SMCTRA BF 869
C132516	Q 7	SMCTRA BF 422
C101134	R 1	RRCF 680E J 0,25
C103158	R 2	RRMO 68K J 0,70
C1011369	⚠ SR 3	RRCFFUL 1K J 0,25
C101246	SR 4	RRCF 6K8 J 0,50
C101246	R 5	RRCF 6K8 J 0,50
C101133	R 6	RRCF 560E J 0,25
C101137	R 7	RRCF 1K2 J 0,25
C101141	R 8	RRCF 2K7 J 0,25
C101151	R 9	RRCF 18K J 0,25
C101138	R 10	RRCF 1K5 J 0,25
C101134	R 11	RRCF 680E J 0,25
C103158	R 12	RRMO 68K J 0,70
C1011368	⚠ SR 13	RRCFFUL 1K J 0,25
C101246	R 14	RRCF 6K8 J 0,50
C101246	R 15	RRCF 6K8 J 0,50
C101133	R 16	RRCF 560E J 0,25
C101137	R 17	RRCF 1K2 J 0,25
C101141	R 18	RRCF 2K7 J 0,25
C101151	R 19	RRCF 18K J 0,25
C101138	R 20	RRCF 1K5 J 0,25
C101134	R 21	RRCF 680E J 0,25
C103158	R 22	RRMO 68K J 0,70
C1011369	⚠ SR 23	RRCFFUL 1K J 0,2K
C101246	R 24	RRCF 6K8 J 0,50
C101246	R 25	RRCF 6K8 J 0,50
C101133	R 26	RRCF 560E J 0,25
C101137	R 27	RRCF 1K2 J 0,25
C101141	R 28	RRCF 2K7 J 0,25
C101151	R 29	RRCF 18K J 0,25
C101138	R 30	RRCF 1K5 J 0,25
C101104	R 31	RRCF 2E2 J 0,25
C101150	R 33	RRCF 15K J 0,25
C101149	R 34	RRCF 12K J 0,25
C101152	R 35	RRCF 22K J 0,25
C101124	R 37	RRCF 100E J 0,25
C101162	R 38	RRCF 150K J 0,25
C101155	R 39	RRCF 39K J 0,25
C101160	R 41	RRCF 100K J 0,25
C101157	R 42	RRCF 56K J 0,25
C101158	R 43	RRCF 68K J 0,25
C1011231	R 44	RRCF 75E J 0,25
C1011231	R 45	RRCF 75E J 0,25
C101148	R 46	RRCF 10K J 0,25
C1011231	R 47	RRCF 75E J 0,25
C1012169	⚠ R 48	RRCFFUL 22E J 0,50
C101151	R 49	RRCF 18K J 0,25
C101144	R 50	RRCF 4K7 J 0,25
C101136	R 51	RRCF 1K J 0,25
C101148	R 52	RRCF 10K J 0,25
C101133	R 53	RRCF 560E J 0,25
C101252	R 54	RRCF 22K J 0,25
C101155	R 55	RRCF 39K J 0,25
C101124	R 56	RRCF 100E J 0,25
C101250	R 57	RRCF 15K J 0,25
C101156	R 58	RRCF 47K J 0,25
C101144	R 59	RRCF 4K7 J 0,25
C101126	R 60	RRCF 150E J 0,25
C101126	R 61	RRCF 150E J 0,25
C131156	Z 1	SMCDIOZEN 0,5C 7V5
C715342	PC	PC 761001
C714744	-	HEATSINK RGB
C313253	-	CON FOBTE IC P28RM 15
C313251	-	CON PIN WIRE

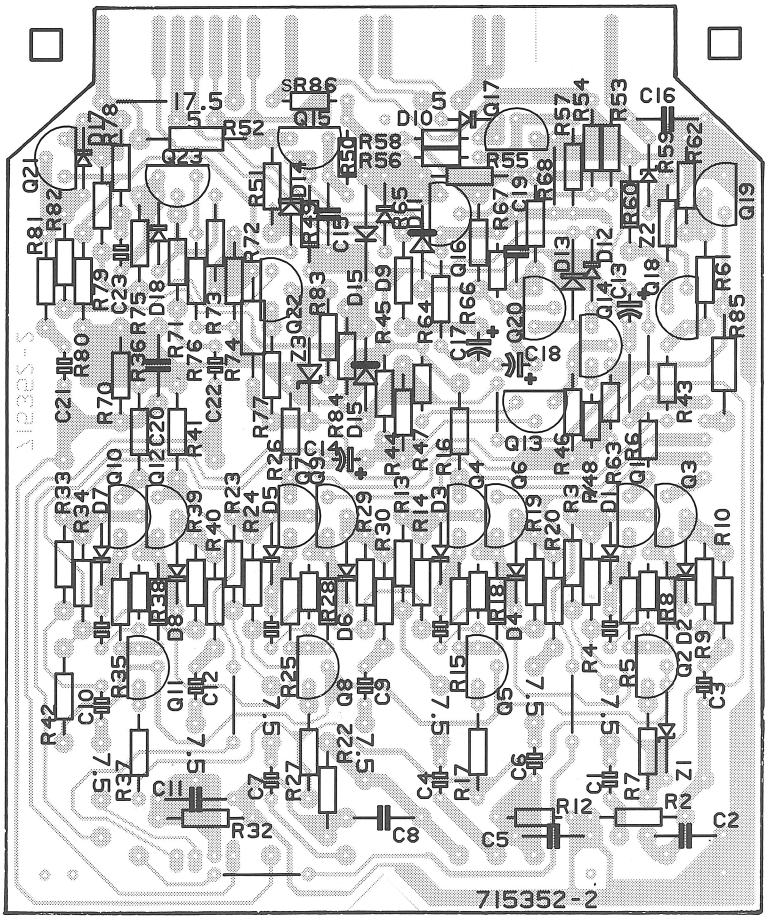
PARTS LIST C761001U

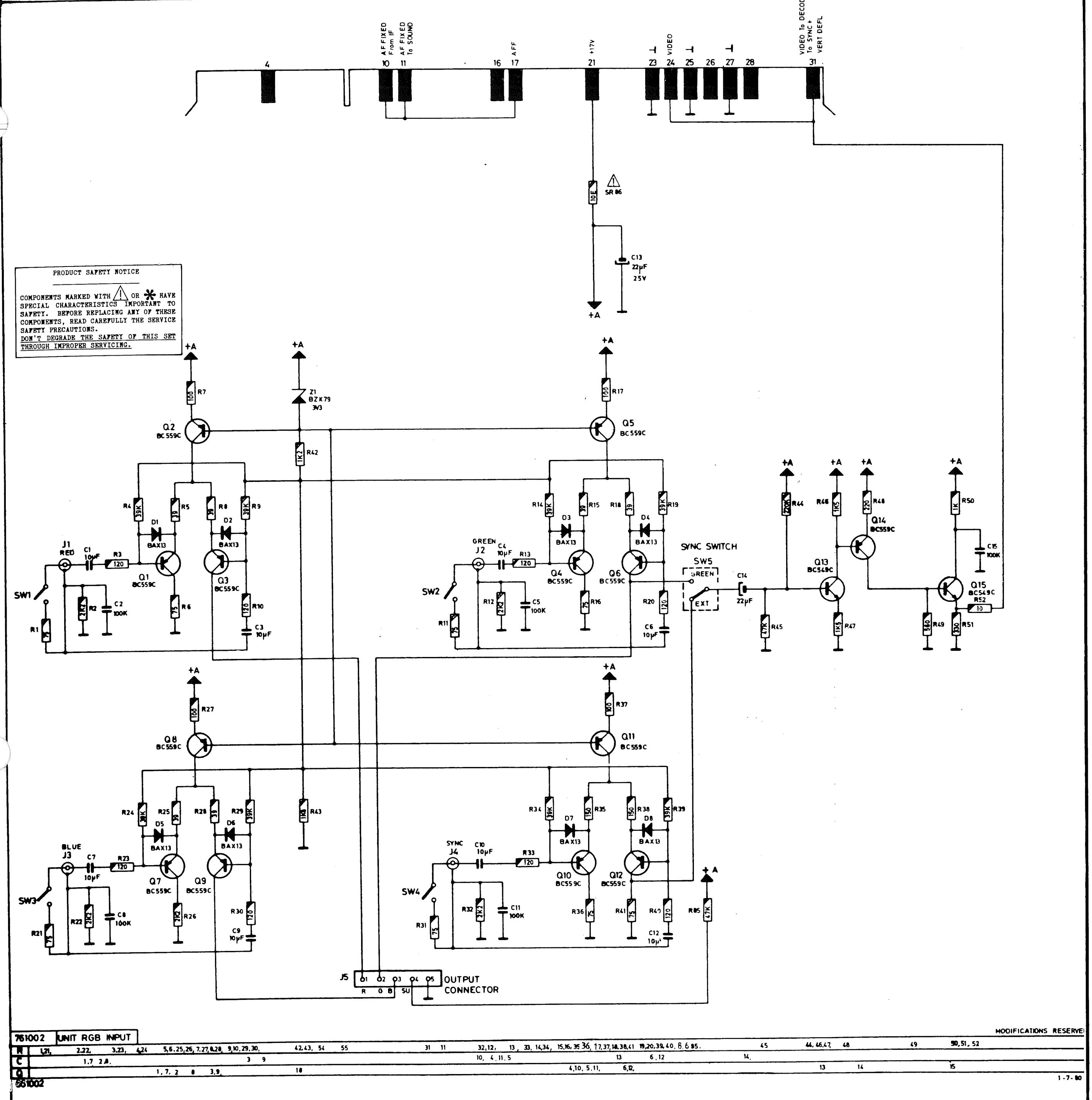
BARCO INDUSTRIES COMMUNICATIONS

RGB In Unit

C761002U




17.5
5
SR86
Q15
R52
D10
Q17
R57
R54
R53
C16
Q21
D17
R78
Q23
R58
R56
R50
R55
R59
R62
R81
R82
R51
D14
R49
C15
R65
D11
Q16
R67
C19
R68
R60
Z2
Q19
R79
C23
D18
R72
R75
R71
R73
Q22
R83
D15
D9
R64
R66
D13
D12
C13
Q18
R61
R80
R36
R76
R74
Z3
R45
C17
Q20
C18
Q14
R85
C21
R70
C20
R4
C22
R77
R84
R44
R47
R43
Q13
R46
R63
R6
R33
R34
Q10
Q12
D7
R39
R40
R23
R24
D5
R26
Q7
Q9
C14
R29
R30
R13
R14
R16
D3
Q4
Q6
R19
R20
R3
R48
D1
Q1
Q3
R10
R38
D8
R28
D6
R18
D4
R8
D2
R9
R35
Q11
C12
R25
Q8
C9
R15
Q5
Q2
C3
R42
C10
R37
7.5
C11
R32
C7
R27
R22
C8
C4
R17
C6
C5
R12
C1
R7
Z1
R2
C2
715352-2


PRODUCT SAFETY NOTICE
COMPONENTS MARKED WITH ⚠ OR ✱ HAVE SPECIAL CHARACTERISTICS IMPORTANT TO SAFETY. BEFORE REPLACING ANY OF THESE COMPONENTS, READ CAREFULLY THE SERVICE SAFETY PRECAUTIONS.
DON'T DEGRADE THE SAFETY OF THIS SET THROUGH IMPROPER SERVICING.
AF FIXED From IF
AF FIXED To SOUND
AFF
+17V
VIDEO
VIDEO To DECOD. To SYNC + VERT DEFL
SR 86
C13 22µF 25V
+A
RED J1
GREEN J2
BLUE J3
SYNC J4
SW1
SW2
SW3
SW4
SYNC SWITCH SW5
GREEN
EXT
Z1 BZX79 3V3
Q1 BC559C
Q2 BC559C
Q3 BC559C
Q4 BC559C
Q5 BC559C
Q6 BC559C
Q7 BC559C
Q8 BC559C
Q9 BC559C
Q10 BC559C
Q11 BC559C
Q12 BC559C
Q13 BC549C
Q14 BC559C
Q15 BC549C
BAX13
J5
OUTPUT CONNECTOR
R O B SU
761002
UNIT RGB INPUT
R
C
Q
661002
MODIFICATIONS RESERVED
1-7-80

RGB INPUT

The incoming red, green and blue signals are amplified by the differential input amplifiers. The output signal of these amplifiers are connected to the RGB amplifier via the five pins connector and the coaxial cables. Also the switching voltage + 12 V is fed into the RGB amplifier to switch IC TDA3500 in the RGB mode (via R85).

The sync. signal for the sync separator (on the vertical defl. board) is taken either from the green input amplifier or from the external sync signal input amplifier depending on the position of switch SW5 (G/X).

PARTS LIST
RGB IN UNIT
Ref. nr.: C761002U

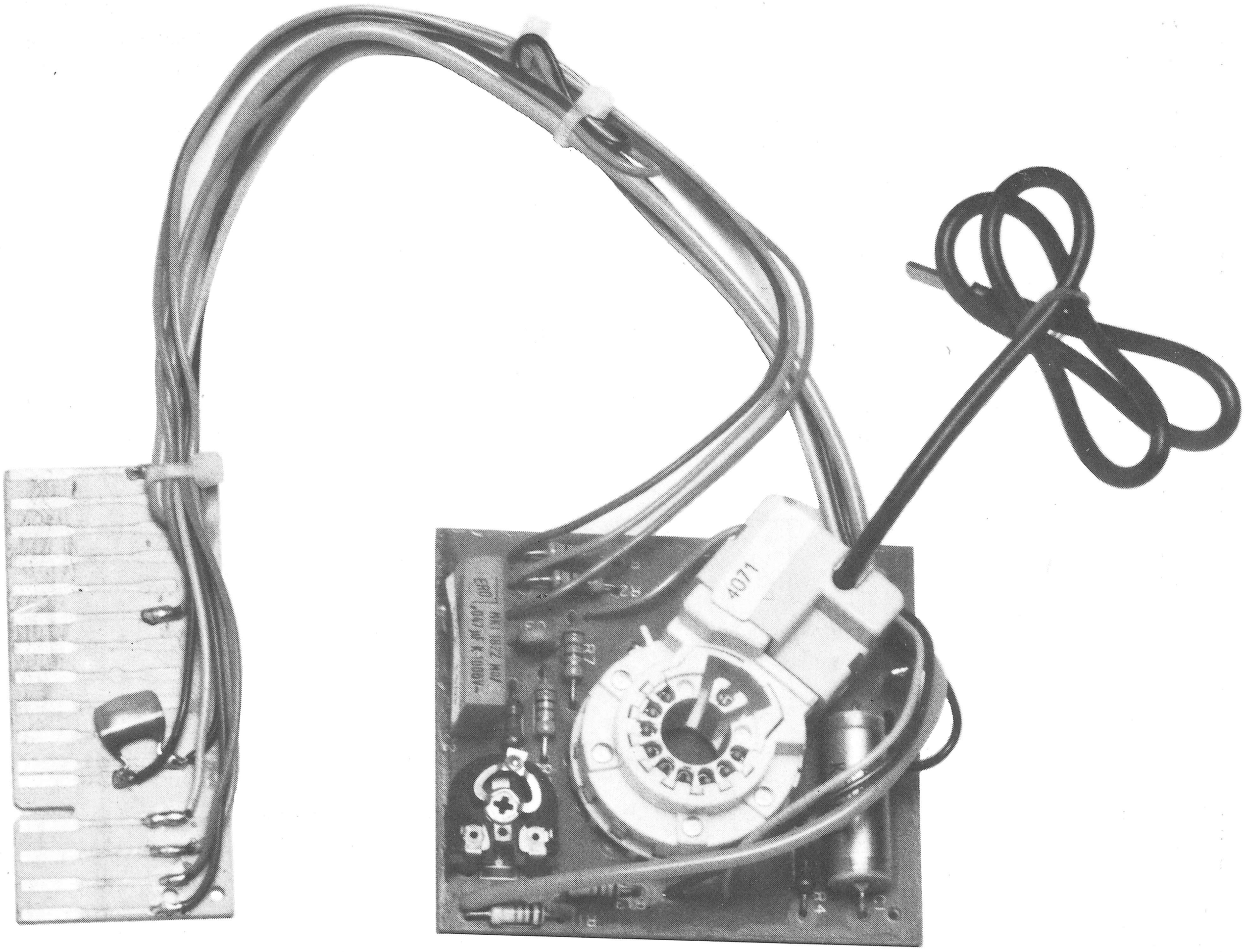
REF. NR.	POSITION	DESCRIPTION
C111680	C1	CELBI 10M V 40
C114100	C2	CPOMEFF 100K K 100
C111680	C3	CELBI 10M V 40
C111680	C4	CELBI 10M V 40
C114100	C5	CPOMEFF 100K K 100
C111680	C6	CELBI 10M V 40
C111680	C7	CELBI 10M V 40
C114100	C8	CPOMEFF 100K K 100
C111680	C9	CELBI 10M V 40
C111680	C10	CELBI 10M V 40
C114100	C11	CPOMEFF 100K K 100
C111680	C12	CELBI 10M V 40
C111475	C13	CELPR 22M Z 25
C111475	C14	CELPR 22M Z 25
C114100	C15	CPOMEFF 100K K 100
C111510	C24	CELPR MI 22M M 25
C112737	C25	CCE MI 680P K5 63
C131621	D1	SMCDIO BAX 13
C131621	D2	SMCDIO BAX 13
C131621	D3	SMCDIO BAX 13
C131621	D4	SMCDIO BAX 13
C131621	D5	SMCDIO BAX 13
C131621	D6	SMCDIO BAX 13
C131621	D7	SMCDIO BAX 13
C131621	D8	SMCDIO BAX 13
C715442	PC	PC761002
C1314182	Q1	SMC BC 559C
C1314182	Q2	SMC BC 559C
C1314182	Q3	SMC BC 559C
C1314182	Q4	SMC BC 559C
C1314182	Q5	SMC BC 559C
C1314182	Q6	SMC BC 559C
C1314182	Q7	SMC BC 559C
C1314182	Q10	SMC BC 559C
C1314182	Q11	SMCTRA BC 559C
C1314182	Q12	SMCTRA BC 559C
C131411	Q13	SMCTRA BC 549C
C1314182	Q14	SMCTRA BC 559C
C131411	Q15	SMCTRA BC 549C
C1011231	R1	RRCF 75E J 0,25
C101140	R2	RRCF 2K2 J 0,25
C101125	R3	RRCF 120E J 0,25
C101155	R4	RRCF 39K J 0,25
C101119	R5	RRCF 39E J 0,25
C1011231	R6	RRCF 75E J 0,25
C101124	R7	RRCF 100E J 0,25
C101119	R8	RRCF 39E J 0,25
C101155	R9	RRCF 39K J 0,25
C101125	R10	RRCF 120E J 0,25
C1011231	R11	RRCF 75E J 0,25
C101140	R12	RRCF 2K2 J 0,25
C101125	R13	RRCF 120E J 0,25
C101155	R14	RRCF 39K J 0,25
C101119	R15	RRCF 39E J 0,25
C1011231	R16	RRCF 75E J 0,25
C101124	R17	RRCF 100E J 0,25
C101119	R18	RRCF 39E J 0,25
C101155	R19	RRCF 39K J 0,25
C101125	R20	RRCF 120E J 0,25
C1011231	R21	RRCF 75E J 0,25
C101140	R22	RRCF 2K2 J 0,25
C101125	R23	RRCF 120E J 0,25
C101155	R24	RRCF 39K J 0,25
C101119	R25	RRCF 39E J 0,25
C1011231	R26	RRCF 75E J 0,25
C101124	R27	RRCF 100E J 0,25
C101119	R28	RRCF 39E J 0,25
C101155	R29	RRCF 39K J 0,25
C101125	R30	RRCF 120E J 0,25
C1011231	R31	RRCF 75E J 0,25
C101140	R32	RRCF 2K2 J 0,25
C101125	R33	RRCF 120E J 0,25
C101155	R34	RRCF 39K J 0,25
C101126	R35	RRCF 150E J 0,25
C1011231	R36	RRCF 75E J 0,25
C101124	R37	RRCF 100E J 0,25
C101126	R38	RRCF 150E J 0,25
C101155	R39	RRCF 39K J 0,25
C101125	R40	RRCF 120E J 0,25
C1011231	R41	RRCF 75E J 0,25
C101137	R42	RRCF 1K2 J 0,25
C101139	R43	RRCF 1K8 J 0,25
C101164	R44	RRCF 220K J 0,25
C101156	R45	RRCF 47K J 0,25
C101138	R46	RRCF 1K5 J 0,25
C101138	R47	RRCF 1K5 J 0,25
C101128	R48	RRCF 220E J 0,25
C101133	R49	RRCF 560E J 0,25
C101136	R50	RRCF 1K J 0,25
C101130	R51	RRCF 330E J 0,25
C101112	R52	RRCF 10E J 0,25
C101156	R85	RRCF 47K J 0,25
C1011129	⚠ SR86	RRCFFUL 10E J 0,25
C131575	Z1	SMCDIOZEN 0,5 C 3V9
C715441	PC	PC 761002
C324127	-	SWITCH 4XA
C313140	-	CONFOLTE COABNC
C313251	-	CON PIN A WIRE
C714613	-	IPL (COVER PLATE)
C313284	-	CON MOB SE

CRT Socket Unit (HR)

C761041

Used in High Resolution Versions (Hitachi)

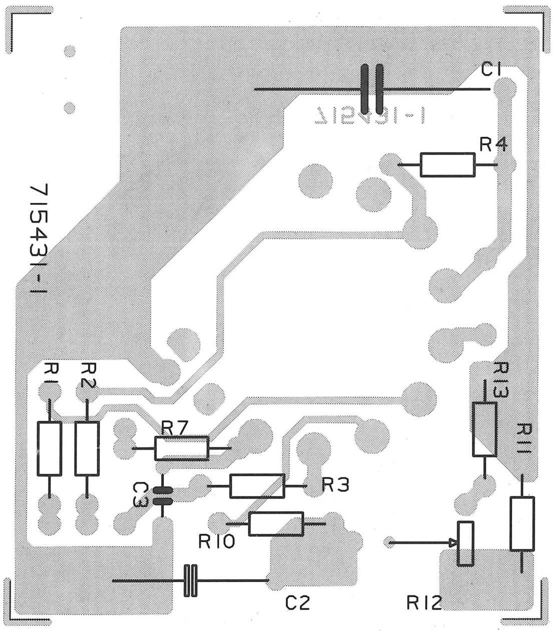
and in High Resolution long persistance versions (Hitachi)



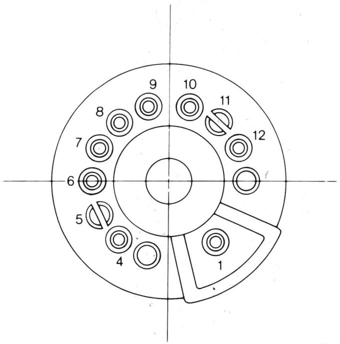
PARTS LIST

CRT SOCKET UNIT HRA

Part nr.: C761041

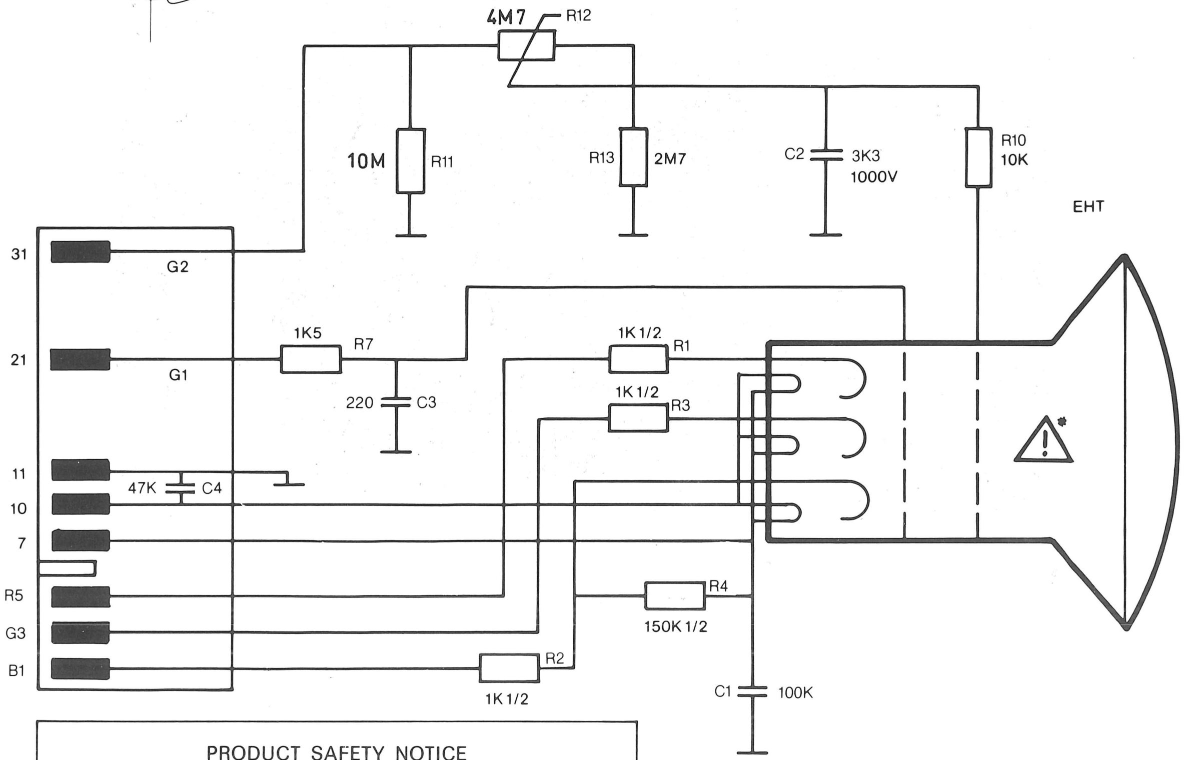

C1
R4
715431-1
R1
R2
R13
R11
R7
C3
R3
R10
C2
R12

REF.NR.	POSITION	DESCRIPTION
C114874	C1	CPO AX100K M 630
C114602	C2	C HV 47K M 1000
C112094	C3	CCE DI220P K 750
C114128	C4	CPOMEFF 47K K 250
C101236	R1	RRCF 1K J 0,50
C101236	R2	RRCF 1K J 0,50
C101236	R3	RRCF 1K J 0,50
C101262	R4	RRCF 150K J 0,50
C101238	R7	RRCF 1K5 J 0,50
C101248	R10	RRCF 10K J 0,50
C104678	R11	RRHV 10M J 0,50
C106316	R12	RTCAS H 4M7 M 0,15
C104664	R13	RRHV 2M7 J 0,50
C311034	-	TUBPICSOC+SG11-13KV
C313580	-	CONMOBTE P1 0,5X2,8
C715431	PC	PC - 761041
C348019	-	WIRTIE L100


9
10
11
8
12
7
6
5
4
1

INDEX OF TERMINAL

Pin No. 1 : Grid No. 3
No. 4 : Cathode of blue gun
No. 5 : NC
No. 6 : Heater
No. 7 : Heater
No. 8 : Cathode of red gun
No. 9 : Grid No. 1
No. 10 : Grid No. 2
No. 11 : NC
No. 12 : Cathode of green gun

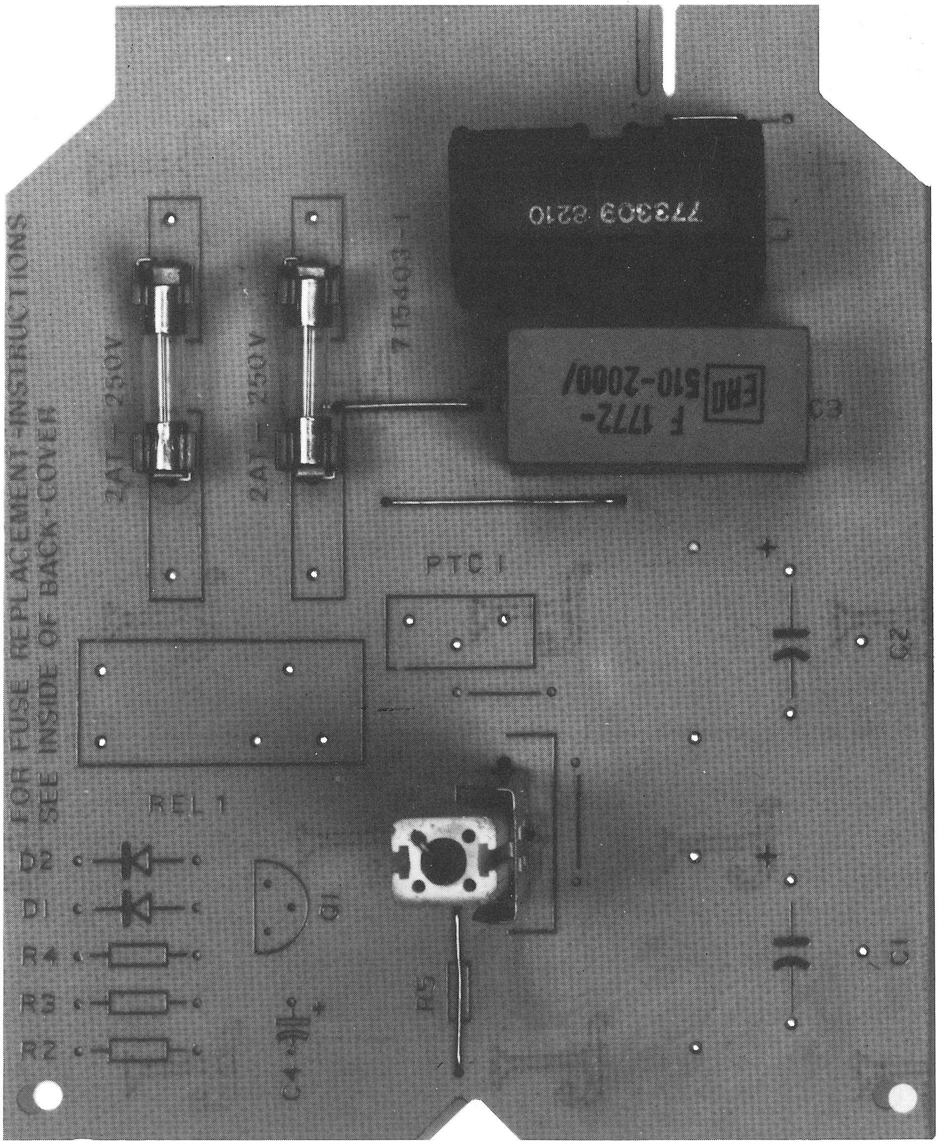

4M7
R12
10M
R11
R13
2M7
C2
3K3
1000V
R10
10K
EHT
31
G2
21
G1
1K5
R7
220
C3
1K 1/2
R1
1K 1/2
R3
11
47K
C4
10
7
R5
G3
B1
R4
150K 1/2
R2
1K 1/2
C1
100K

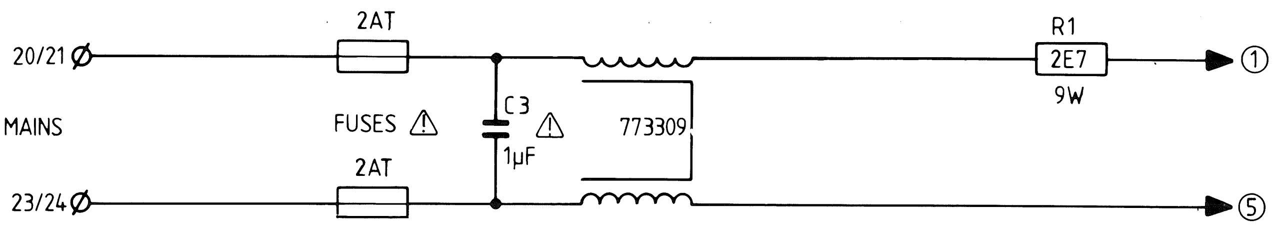
PRODUCT SAFETY NOTICE

Components marked with ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully the service safety precautions.

Mains Input Unit 220 V

C761102


FOR FUSE REPLACEMENT-INSTRUCTIONS
SEE INSIDE OF BACK-COVER
2AT 250V
2AT 250V
715403-1
773303 8210
L1
ERO F 1772-510-2000/
C3
PTC 1
REL 1
D2
D1
R4
R3
R2
Q1
R5
C4
C2
C1



1	S.M. POWER SUPPLY
5	S.M. POWER SUPPLY
20	MAINS
21	MAINS
23	MAINS
24	MAINS

PRODUCT SAFETY NOTICE

Compenents marked with ⚠ or ★ have special characteristics important to safety. Before replacing any of these components, read carefully the service safety precautions.

Don't degrade the safety of this set through improper servicing.

C76110 | MAINS FILTER

MODIFICATIONS RESERVED

06-05-82

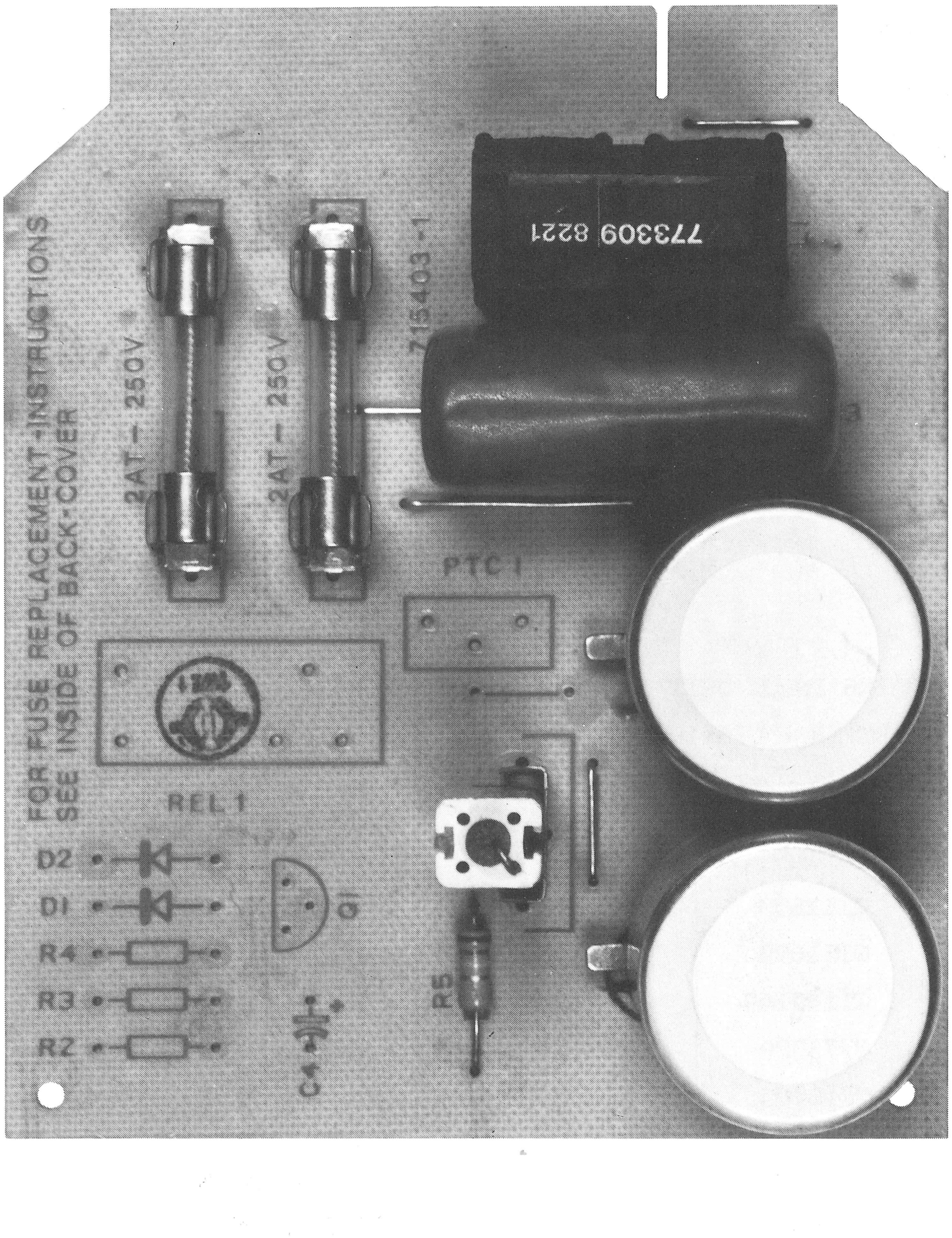
MAINS INPUT UNIT 220V

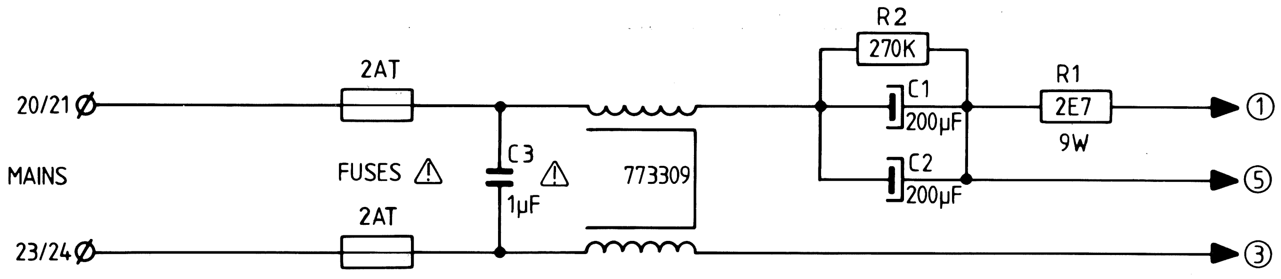
PART NR : C761102

REF.NR.	POSITION	DESCRIPTION
C1147169	⚠ C3	CP09R00UL 1M KAC250
C773309	L1	SPOCHOKE NETWCTV32
C715403	PC	PC - 761085 01
C104309	R1	RRWW V 2E7 K9
C314501	-	FUSE CLIPS
C314116	⚠ -	FUSE 2AT
C313220	-	RRWW V HOLDER N10

Mains Input Unit 120 V

C761103


FOR FUSE REPLACEMENT-INSTRUCTIONS
SEE INSIDE OF BACK-COVER
2AT - 250V
2AT - 250V
715403-1
773309 8221
PTC 1
REL 1
D2
D1
R4
R3
R2
R5
C4
Q1



1	S.M. POWER SUPPLY
3	S.M. POWER SUPPLY
5	S.M. POWER SUPPLY
20	MAINS
21	MAINS
23	MAINS
24	MAINS

PRODUCT SAFETY NOTICE

Compenents marked with ⚠ or ★ have special characteristics important to safety. Before replacing any of these components, read carefully the service safety precautions.

Don't degrade the safety of this set through improper servicing.

C761103 MAINS FILTER

MODIFICATIONS RESERVED

06-05-82

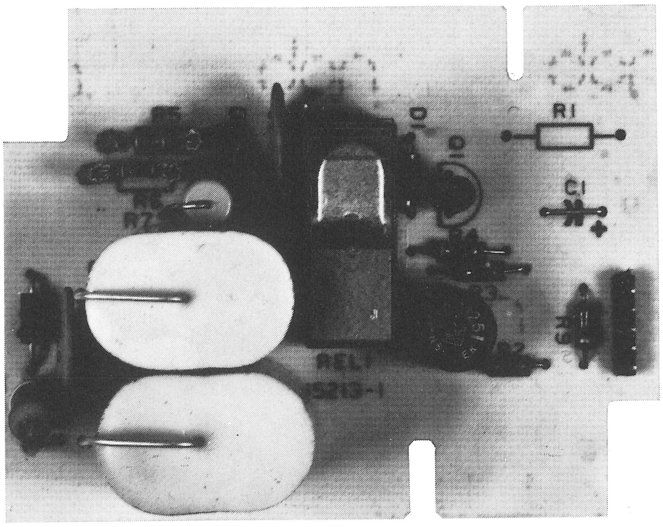
MAINS INPUT UNIT 120V

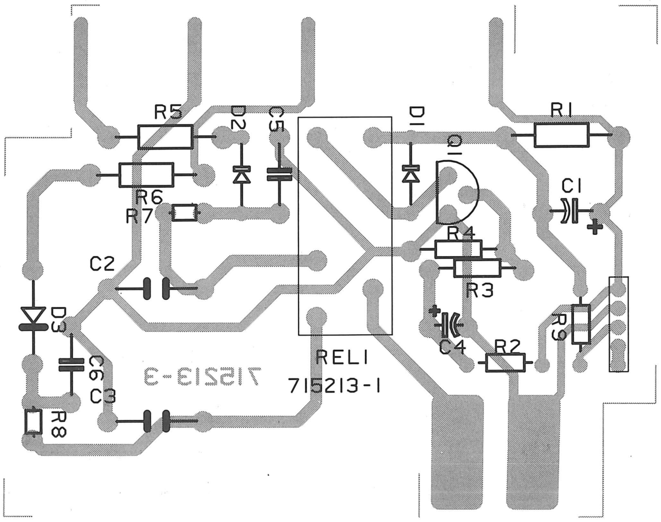
PART NR : C761103

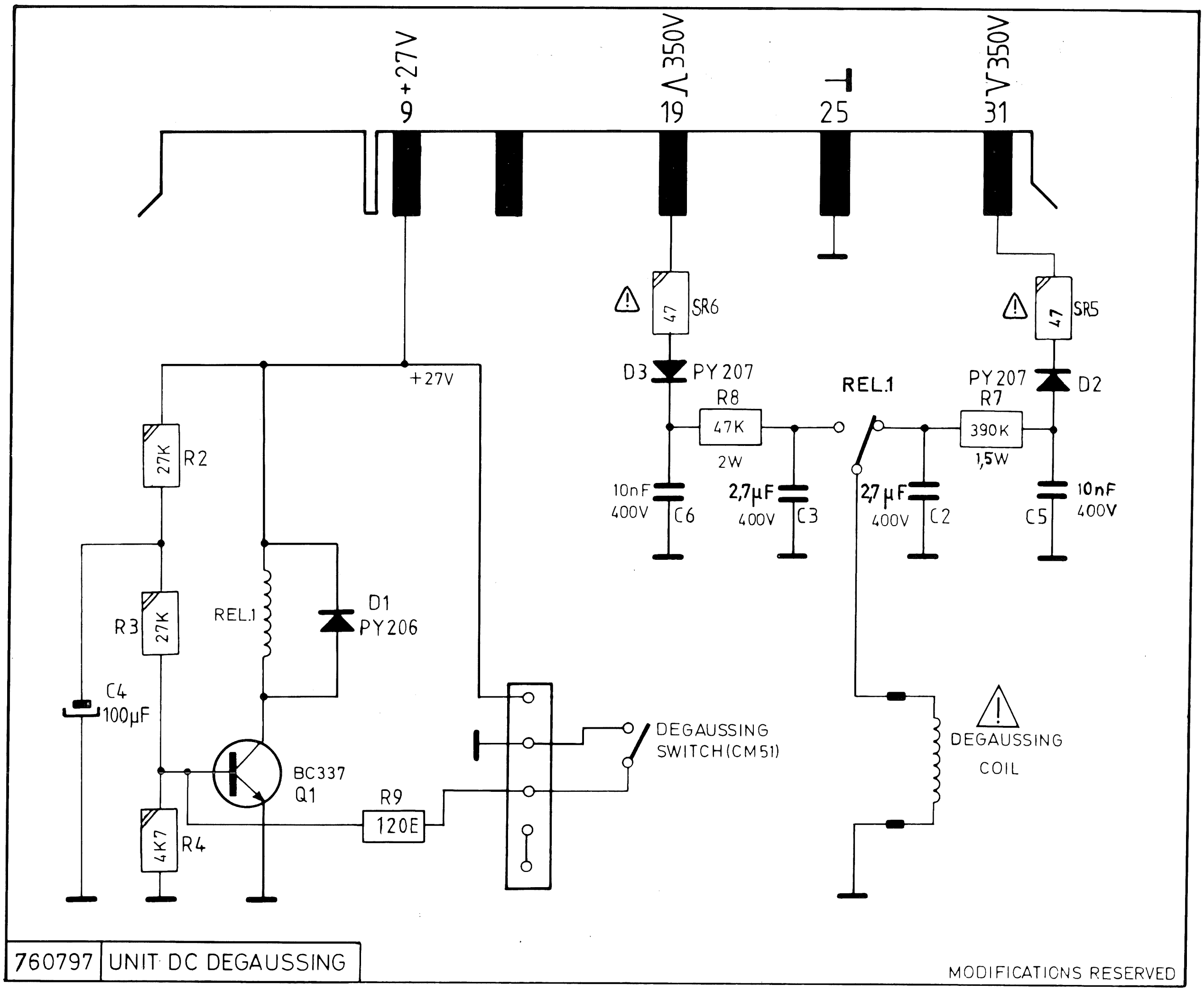
REF.NR.	POSITION	DESCRIPTION
C111699	⚠C1	CELBI 200M OHM 180
C111699	C2	CELBI 200M OHM 180
C1147149	C3	C UL 470K MAC 125
C773309	L1	SPOCHOKE NETWCTV32
C715403	PC	PC - 761085
C104309	R1	RRWW V 2E7 K9
C101265	R2	RRCF 270K J 0,25
C314132	-	FUSE CLIPS 6.3 x32
C314138	⚠-	FUSE 2AT
C313220	-	RRWW V HOLDER H10

Degaussing 12 V Unit

C760797U




R5
D2
C5
D1
R1
Q1
R6
R7
C1
C2
R4
R3
D3
R9
C4
C6
R2
C3
R8
715213-3
RELI
715213-1


9 +27V
19 ∧350V
25
31 ∨350V
⚠ 47 SR6
⚠ 47 SR5
D3 PY 207
R8 47K 2W
REL.1
PY 207 R7 390K 1,5W
D2
10nF 400V C6
2,7μF 400V C3
2,7μF 400V C2
C5 10nF 400V
+27V
27K R2
R3 27K
REL.1
D1 PY206
C4 100μF
BC337 Q1
R9 120E
4K7 R4
DEGAUSSING SWITCH(CM51)
⚠ DEGAUSSING COIL
760797 UNIT DC DEGAUSSING
MODIFICATIONS RESERVED

PRODUCT SAFETY NOTICE

Components marked with ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully the service safety precautions.

PARTS LIST
DEGAUSSING UNIT
Part nr.: C760797U

REF.NR.	POSITION	DESCRIPTION	REF.NR.	POSITION	DESCRIPTION
C114597	C2	CPP PO 2M7 K 350	C101144	R4	RRCF 4K7 J 0,25
C114597	C3	CPP PO 2M7 K 350	C1011209	⚠ SR5	RRCFFUL 47E J 0,25
C111477	C4	CELPR 100M Z 25	C1011209	⚠ SR6	RRCFFUL 47E J 0,25
C112837	C5	CCE DI 10K S 400	C101467	R7	RRCF 390K J 1,50
C112837	C6	CCE DI 10K S 400	C103256	R8	RRMO 47K J 1,50
C131910	D1	SMCDIO PY 207	C101128	R9	RRCF 220E J 0,25
C131910	D2	SMCDIO PY 207	C133036	-	RR HOLDER D6/2,4L 6
C131910	D3	SMCDIO PY 207	C313276	-	CONMOBTE 2.5 PIO
C131426	Q1	SMCTRA BC 337	C324338	-	RELAY 1150E 2714
C101153	R2	RRCF 27K J 0,25	C715425	-	PC - 760797
C101153	R3	RRCF 27K J 0,25	C7733015	⚠ -	DEGAUSSING COIL DC

GD 33 Recommended Spare Parts

BARCOM Database nr.: 332232

DESCRIPTION	REFERENCE NR	POSITION
RGB OUT UNIT	C761001U	-
SMC TRA BF 469	1325145	Q1-Q3-Q5
SMC ICL 3500	132734	IC1
VERT & SYNC DEFL UNIT	C760747U	-
SMC ICL WBA TDA 1170	132164	IC2
SMC TRA BF 422	132516	Q10
SMC TRA BF 423	132552	Q11
SMC TRA TIP33 B = BD237	132519	Q5
SM POWER SUPPLY UNIT	C760228U	-
SMC TRA BU 208 A	132509	Q1
SMC THY ESM 4629	132207	TH1
HOR. DEFL. & EHT UNIT	C761000U	-
SMC TRA BU 208 A	132509	Q1
SMC DIO REC BG 1895	132057	D1
SMC TRAINS TO3	133008	
VERT & SYNC DEFL UNIT	C660019	-
SMC ICL WBA TDA 1170	132164	IC2

Used abbreviations:

SMC: semiconductor
TRA: transistor
ICL: integrated circuit linear
THY: thyristor
REC: rectifier

JVM - 01/09/82

a) Check the switch mode power supply voltage on the cathode of D18 on the power supply board. This voltage should lay between 122,5 and 127,5 V and normally needs no readjustment.

b) Horizontal frequency (P1 on sync & vert defl. board)

- Connect a test generator or your picture generator to the input sockets. It is important to have the same signal timings as in the proper application.
- Short circuit the testpoint 1 (pin 6 of TBA 920) to ground.
- Adjust P1 (625 l.) in order to get minimal horizontal beat.
- Take away the short circuit.

c) Vert. hold. (P5 on sync & vert defl. board)

- Short circuit TP2 (base of Q7) to ground.
- Adjust P5 (vert hold) to obtain an upwards vertical beat of 3 turns per second approx.
- Take away the short circuit.

d) Phase control (P12 on sync & vert defl)

- Adjust P12 (between Q1 and IC1) to obtain a properly centered picture. All information should be visible when the blanking time of the video signal is 10 S.

e) Pulse Unit

- Connect the sync signal (or composite green signal) to one channel of the oscilloscope.
- Connect the other channel to the pulse output (pin 3 or the collector of Q3 on the pulse unit).
- Adjust P3 (on the pulse unit) so, that the leading edge of the sandcastle pulse starts just after the trailing edge of the sync signal.

f) Focus

- Adjust the focus potentiometer on the horizontal deflection board to obtain a sharp picture.

g) Geometry

Adjust the following points in order to obtain the best possible undistorted crosshath pattern:

- Vertical amplitude	P7 on sync & vert. defl. board
- Horizontal amplitude	P2 on sync & vert. defl. board
- Horizontal linearity	Linearity control on hor. defl. board
- Horizontal shift	P2 on hor. defl. board
- Vertical shift	P10 on sync & vert. defl. board
- Pincushion	P3 on sync & vert. defl. board
- Trapezium distortion	P4 on sync & vert. defl. board
- Vertical linearity	P9 on sync & vert. defl. board

h) Adjustments of the RGB amplifier:

Two methods exist for adjusting the gain and cut-off potentiometers (high and low lights). The first method is very precise but requires a correctly adjusted color analyzer and a white and black window generator. The second method is not very accurate but only requires a voltmeter and a normal generator. As the color temperature is correctly set in the factory it is recommended that, unless it is necessary, the potentiometers be left unchanged.

The first five steps are common to both methods:

1. Turn the cut-off (Lo) and gain (Hi) potentiometers to obtain minimum light output.
2. Turn each of the gain potentiometers to approx 1/3 of their range.
3. Switch on the set and apply a grey scale test signal.
4. Place the contrast and the brightness in their mid-position.
5. Adjust the G2 potentiometer on the CRT socket so that the darkest grey bar just becomes visible.

First method:

6. Allow the monitor to warm up for at least 30 minutes.
7. Fix the head of the color analyzer (e.g. a Philips PM 5529 graduated for 6500 K for the picture tube in question) to the centre of the screen.
8. Shield the screen from incident light.
9. Apply the black window signal (sync + 55 mV video).
10. Place the contrast potentiometer in its mid-position.
11. Using the oscilloscope, adjust the brightness so that the black level is the same as the clamp level on the cathode of the green electron gun.
12. The three cut-off potentiometers (P4, P5, P6) are now adjusted to give 0.3 nit for each color on the 1 nit scales of the analyzer (for the PM 5529 the last two buttons pressed in).
13. Apply the white window signal (sync. + 700 mV).
14. Adjust the three gain potentiometers (P1, P2, P3) to give 80 nit for each color on the 100 nit scales.
15. Check the tracking by adjusting the contrast from 80 nit to 0.3 nit and seeing that the movement of the 3 meters coincide. If not repeat the adjustments.

Second method:

6. Adjust the cut-off potentiometers to obtain a good grey scale in the darkest parts of the picture.
7. The gain potentiometers (P4, P5 and P6) should be adjusted to obtain a voltage of 35 Vpp, measured on the cathodes of R, G and B, when driving with a video signal of 0.7 Vpp and the contrast control in the mid position.
8. Readjust the cut off potentiometers P1, P2 and P3 to obtain a neutral gray on the darkiest bars of the grayscale test signal.

Codes to Parts Lists

AUTPC : automatic printed circuit board

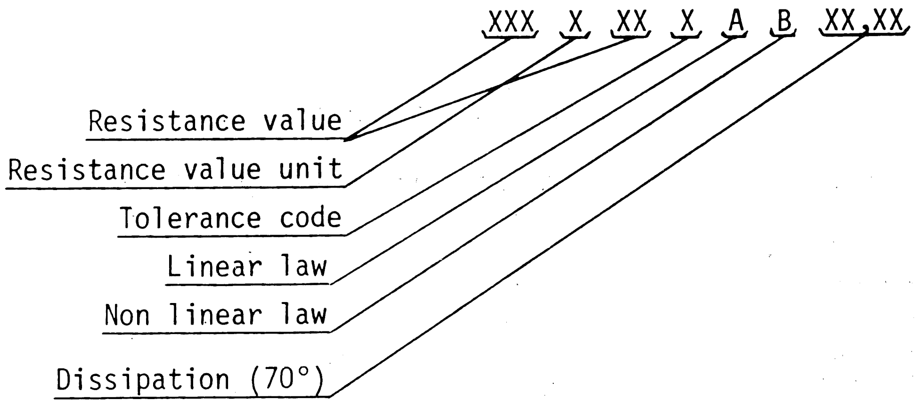
Ch. support : chassis support
CPL : complete
CERFIL : ceramic filter
C EL AX : capacitor electrolytic axial
C CE MI : capacitor ceramic miniature
C CE SA DI : capacitor ceramic save disc
C CE UM : capacitor ceramic up right mounted
C EL PR : capacitor electrolytic printed circuit
C EL SN : capacitor electrolytic snap-in
C EL TA : capacitor electrolytic tantalium
C NPO TU : capacitor ceramic class 1, temp. coeff. NPO, tubular
C N152 : capacitor ceramic class 1, temp. coeff. N1500
C NPO MI : capacitor ceramic class 1, temp. coeff. NPO, miniature
C HV : capacitor high voltage
C PE TP FP : capacitor polyethylene tinned plate flat pack
C PO AX : capacitor polyester axial
C PO FF : capacitor polyester film foil
C PO ME FF : capacitor polyester metal film foil
C PO ME PO : capacitor polyester metal potted
C PO SA PO : capacitor polyester save potted
C PP DD : capacitor polypropylene dual dielectric
C SR : capacitor styroflex
C ST TR : capacitor steatiet trapezium or trimmer

CON 8P 1Z EPC : connector 8 pin 1 marker single printed circuit
CON PIN OWIRE : connector pin on wire
CON F O B S E AUD P : connector female on board side entrance audio pin
CON F O B S E PHO P : connector female on board side entrance phone pin
CON F O B T E : connector female on board top entrance
CON F O C T E COA BNC : connector female on board top entrance coax BNC
CON M O B T E : connector male on board top entrance
CON M O B T E P10 : connector male on board top entrance pin 10

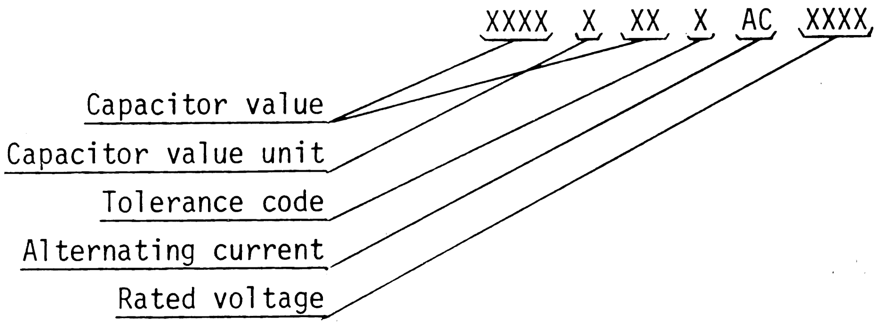
DEF COM LINE C : deflection components line control
DEF COM MULTIP : deflection components multipole
DEF COM YOKE : deflection components yoke
DELAY L : delay line

Fix. : fixation
Fix. degaussing ABS : degaussing fixation ABS
Fix. degaussing NYL : degaussing fixation nylon
Fix. rib : fixation rib

PC	: printed circuit board
R M CA S	: resistor group multiturnpotentiometer carbon standard
R P CA	: resistor group potentiometer carbon
R P CA M H	: resistor group potentiometer carbon miniature horizontal
R R CF	: resistor group resistor carbon film
R R HV	: resistor group resistor high voltage
R R MO	: resistor group resistor metal oxide
R R NTC	: resistor group resistor negative temp. coeff.
R R PTC	: resistor group resistor positive temp. coeff.
R R WW	: resistor group resistor wire wound
R R WW H	: resistor group resistor wire wound horizontal
R R WW V	: resistor group resistor wire wound vertical
R T CA KH	: resistor group trimmerpotentiometer carbon knob horizontal
R T CA M	: resistor group trimmerpotentiometer carbon miniature
R T CA S	: resistor group trimmerpotentiometer carbon standard
R T WT	: resistor group trimmerpotentiometer wire wound tapped
R T WW	: resistor group trimmerpotentiometer wire wound
SMC DIO	: semiconductor diode
SMC DIO PIN	: semiconductor diode pin
SMC DIO REC	: semiconductor diode rectifier
SMC DIO VAR	: semiconductor diode varicap
SMC ICD	: semiconductor integrated circuit digital
SMC ICL	: semiconductor integrated circuit linear
SMC IC LED	: semiconductor integrated circuit LED diode
SMC ICL MAT	: semiconductor integrated circuit linear matrix
SMC ICL OSC	: semiconductor integrated circuit linear oscillator
SMC ICL POA	: semiconductor integrated circuit linear power amplifier
SMC ICL VOL	: semiconductor integrated circuit linear voltage
SMC THY	: semiconductor thyristor
SMC TRA	: semiconductor transistor
SMP	: screw metal parallel head
SPO choke	: choke coil
SPO IF	: coil intermediate frequency
SPON	: mains coil
SPO REJ	: rejector coil
TF	: thick film
TRF EHT	: transformer extra high tension
TRF SM Power	: transformer switch mode power
TUBPIC	: picture tube
TUBPICSOC	: picture tube socket
X-tal	: crystal
Wirtie	: wire tie


XXX X XX X A B XX,XX
Resistance value
Resistance value unit
Tolerance code
Linear law
Non linear law
Dissipation (70°)

Capacitor code


XXXX X XX X AC XXXX
Capacitor value
Capacitor value unit
Tolerance code
Alternating current
Rated voltage

Tolerance code

Character	Capacitor or resistor tolerance	Character	Capacitor or resistor tolerance
A	Tolerances without characters	N	± 30 %
B	± 0,1 pF, Ω, %	P	+ 100 % - 0 %
C	± 0,25, ± 0,3 pF, Ω, %	Q	+ 30 % - 10 %
D	± 0,5 pF, Ω, %	R	+ 30 % - 20 %
E		S	+ 50 % - 20 %
F	± 1 pF, Ω, %	T	+ 50 % - 10 %
G	± 2 pF, Ω, %	U	+ 80 % - 0 %
H	± 2,5 %	V	+ 100 % - 10 %
J	± 5 %	W	+ 20 % - 0 %
K	± 10 %	X	
L	± 15 %	Y	+ 50 % - 0 %
M	± 20 %	Z	+ 100%; + 100% - 20%; - 10%

NOTA'S NOTES NOTES

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